GuideTRAX V3.1 (HT)

User Manual

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GuideTRAX V3 User Manual

Written for GuideTRAX Version 3.1

Publication Date, March 2006

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1

Introduction

GPS guidance systems allow agricultural machinery to be far more productive by providing accurate and real time information for vehicle navigation and placement of product. Specifically the RINEX guidance systems provide an easy to use interface through the colour touch screen for vehicle guidance. The system may be used for any agricultural task which requires vehicle navigation, particularly for applications or treatment of chemicals and/or fertilisers and seeds.

Treated areas can be seen on the screen as the vehicle is working, providing a continuous guidance display with additional information relating to the field and treatment. The RINEX guidance system records information until it is manually cleared so operations can be interrupted if necessary, and completed at a later date.

GuideTRAX V3 has been developed by RINEX primarily for vehicle guidance in agricultural applications. In addition to this GuideTRAX V3 can be configured for control of automated steering systems and/or automated boom section control.

GuideTRAX has evolved over many years and the release of GuideTRAX V3 software heralds a new era with the addition of field planning and data management modules to further enhance the guidance software.

GuideTRAX V3 is configured for three different user levels. The system, depending upon purchase is configured as either a HL, HT, or HR model. Each model is described in a separate manual.

Accordingly this manual is specifically designed to assist users of the Saturn guidance systems in the operational use of GuideTRAX V3 HT software.

1.1 This Manual

This manual is designed for use with the Saturn “HT” model guidance system as manufactured by RINEX.

This manual will refer to buttons which appear on the screen. The screen is touch sensitive, which means that the system is operated by touching the buttons on the screen. The user should touch the button on the screen with their finger to select the button.

This manual will adopt the following conventions when describing the selection of a button or a series of buttons in order to access a particular function or section of the program.

A button on the screen refers to icons or images that appear on the screen. An example of a button is shown in Figure 1-1.

Figure 1-1 The FIELD button

FIELD Refers to the FIELD button as illustrated in Figure 1-1.

When it is necessary to locate a particular part of the V3 program by touching a number of buttons this will be referred to as “Access” and show the necessary buttons to touch in order to access the function starting from the Main Menu.

Access: **SETUP** **ABOUT GUIDETRAX** **REGISTER**

1.2 The Saturn Series

RINEX manufacture a variety of guidance and control systems, including the Saturn series of guidance systems. The series has evolved over the years as development in computer technology has also evolved.

GuideTRAX V3 software was designed specifically to operate on the Saturn “H” series which incorporates an intelligent power supply with an embedded Windows® operating system. Specifications for the Saturn "H" series are provided in Appendix 2.

The Saturn “H” series guidance systems automatically control the power position according to the vehicle ignition status which means that the guidance system is operational when the vehicle is running and inactive (OFF) when the vehicle is shutdown.

1.3 GuideTRAX V3

GuideTRAX V3 is designed to provide one easy to use interface which can accommodate different user requirements as necessary. RINEX recognizes that many users want their systems to grow with their requirements, which is exactly how GuideTRAX V3 is designed to operate. GuideTRAX V3 is a modular system that has 3 main levels of operation which are all built on a common hardware platform. All GuideTRAX V3 systems can operate with any level and type of GPS positioning from RTK to a stand alone GPS. A user can purchase an entry level system that can be expanded in the future to accommodate more advanced data management features as well as the options of AutoSPRAY and AutoSTEER. The following sections describe the features and assets of each version of GuideTRAX V3

1.3.1 Saturn HL Version

The Saturn HL is designed as an entry level guidance system. The HL incorporates the same guidance functions as found on the higher level versions including parallel, racetrack and contour guidance and is built on the same common hardware platform. Furthermore it provides the same functionality for vehicle modelling as found in the other versions and still allows for many optional features to be added at a later date. The HL offers a large full colour touch panel screen with a moving map display, and has the most simple and intuitive operator interface on the market.

Primarily the HL is designed to allow users to purchase a fully featured guidance system which is economically priced and totally upgradeable for the future.

1.3.2 Saturn HT Version

The Saturn HT is designed for the user who requires an easy to use guidance system which can include the options of automated steering control and automated boom section control. The HT provides the user with the most advanced guidance functions provided on any system throughout the world. The user can choose and swap between parallel or “lock” guidance in any field with the touch of a button. The HT will allow the user to permanently save fields to memory, which can then be exported to an office program very simply, using a USB memory stick.

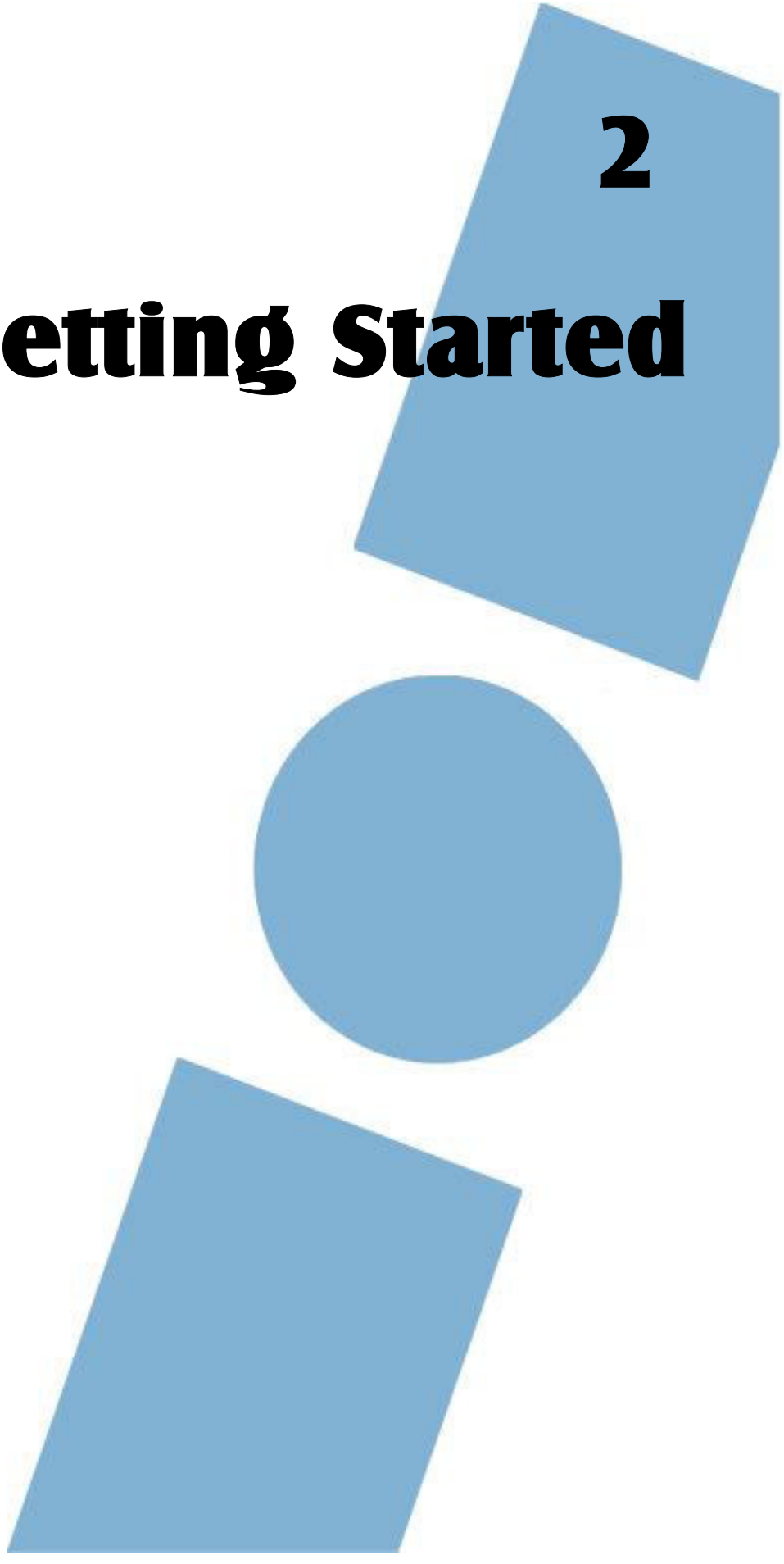
The HT can be configured with the optional modules of AutoSPRAY and AutoSTEER, most other RINEX peripherals can be added, or the HT can be upgraded to the Saturn HR.

1.3.3 Saturn HR Version

The Saturn HR is designed for the user who requires full record management functions and integration with farm mapping and QA programs. The HR is PLANCENTRIC which is a total system where season plans can be designed, transferred to the vehicle for application, record application data then export back to office programs for archiving. HR brings AutoFIELD recognition and a range of new features that allows important information to be recorded without any user involvement. The HR is the only system for complete data integration with PAM software or the supplied RINEX Office package. The HR can be configured with the optional modules of AutoSPRAY and AutoSTEER, making it the world's smartest guidance system.

2

Getting Started



GuideTRAX V3 operates on colour touch screen. Hence to access any function on the system it is a simple case of touching or tapping the screen on the appropriate button.

The RINEX screen is a 22cm (diagonal measurement), or an optional 27cm, which should be securely attached to the vehicle in accordance with the installation manual.

This section describes the correct way in which to power the system ON and OFF and the various parts of the screen that both displays and allows the user to enter information into the system. Understanding the terminology of the various parts of the screen is important as the manual refers to these parts when describing the functions of the guidance system.

This section also details how to correctly configure the Saturn “H” system prior to use for the first time.

It is recommended that all users, including users of earlier RINEX systems, read this section to familiarise themselves with the operation of GuideTRAX V3.

First time users of RINEX guidance systems are encouraged to read the entire manual to ensure that they are aware of the many features provided on the Saturn “H” system with GuideTRAX V3 software.

2.1 Starting the System

Prior to starting with this manual the guidance system should be completely installed into the vehicle in accordance with the instructions in the installation manual.

1) Turn the Isolation Power Switch (IPS) on the Interface Box to the ON position (-). This will not immediately power the system as the vehicle ignition must also be ON. See Figure 2-1 to locate the IPS.

2) With the IPS on the Interface Box in the ON position, start the vehicle and leave the engine running. The Saturn guidance system will start to power on after a short period.

3) Whilst the system is starting the screen will display information pertaining to the onboard computer system. This is the normal starting sequence and can be ignored. Once the system finishes loading GuideTRAX V3 the Main screen will be displayed and the system is ready for operation.

Figure 2-1 : The Saturn "H" interface box & Isolation Power Switch

In normal operation, leave the Isolation Power Switch (IPS) on the Interface Box in the ON position (-) at all times.

4) To shut the Saturn "H" system OFF turn the vehicle ignition off. This will power down the Saturn "H" system. The IPS should not be switched to the OFF position.

Hints and Tips:

- *There is no Exit button in GuideTRAX V3 (some earlier versions of GuideTRAX V3 did have an EXIT button). Do not turn the system off by turning the IPS to the OFF position on the interface box. Shutting down the system in this way may cause the loss of important system information.*
- *It is possible that the system will start to the Launcher menu and not GuideTRAX V3 Main Screen if the system was shutdown incorrectly. In this situation select the option **Start GuideTRAX** to move to the Main Screen.*

2.2 The Startup Screen

As the system is starting up, it will display the three screens shown in Figure 2-2, Figure 2-3 and Figure 2-4 below:

Figure 2-2: The RINEX Windows First Startup Screen

Figure 2-3: The RINEX Windows Second Startup Screen

Figure 2-4: GuideTRAX V3.1 (HT) Startup Screen

The GuideTRAX startup screen displays the model (HT) and version (3.1) of software. It also shows whether the AutoSPRAY or AutoSTEER options are enabled on your system. It also shows that theAutoFIELD option is **not** enabled in the HT model.

2.3 The Main Screen

The system will be ready for operation once the main screen, shown in Figure 2-5 is displayed. This is known as the Main screen and its functionality is described in detail in this manual.

The screen is touch sensitive, which means that the system is operated by touching the buttons on the screen. The user should touch the button on the screen with their finger to select the button.

Under no circumstances should any sharp implement be used to touch the screen or should excessive force be used when touching the screen.

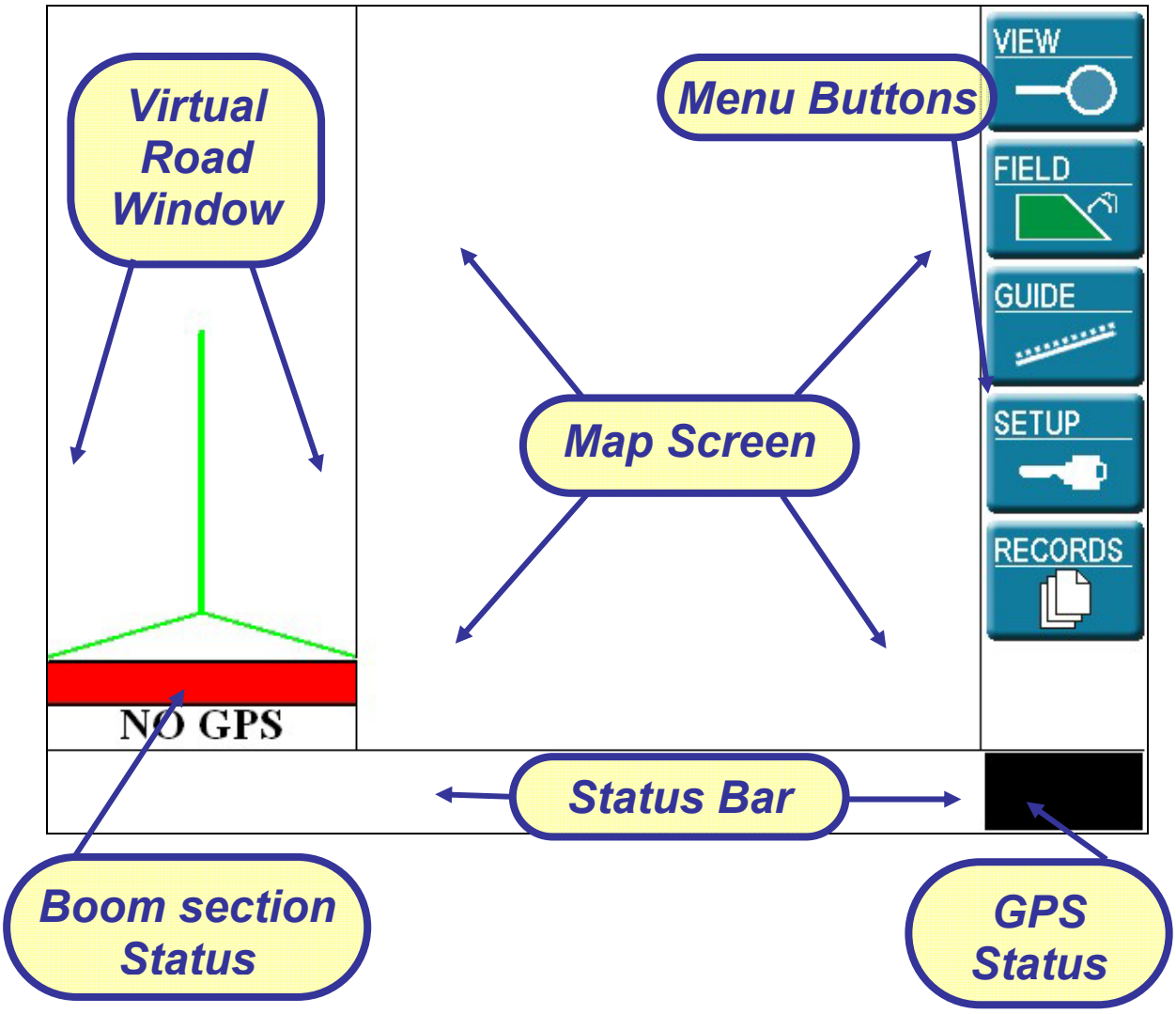


Figure 2-5: The Main Screen

Overview: The main screen displays the following information.

Item	Description
Map Screen	The Map Screen occupies the greater part of the overall screen and displays the treated area as a map view.
Virtual Road Window	The Virtual Road Window on the left hand side of the screen can be toggled ON or OFF. If guidance is not activated the screen will not display a Virtual Road.
Status Bar	The Status Bar is located at the bottom of the main screen. It can be toggled to display status information relating to the field and system.
GPS Status	The GPS Status Indicator is used to display the current GPS status. A visual alarm will be displayed if the GPS does not conform to the setup parameters.
Menu Buttons	The Menu Buttons are displayed on the right hand side of the screen. The buttons will change as sub-menus are selected for operation.
Boom Section Status	The Boom Section Status displays the ON / OFF status of one or more boom sections dependant upon the configuration of the system.

Hints and Tips:

- *The Main Screen may vary dependant upon the options configured on the system.*

2.4 Map Screen

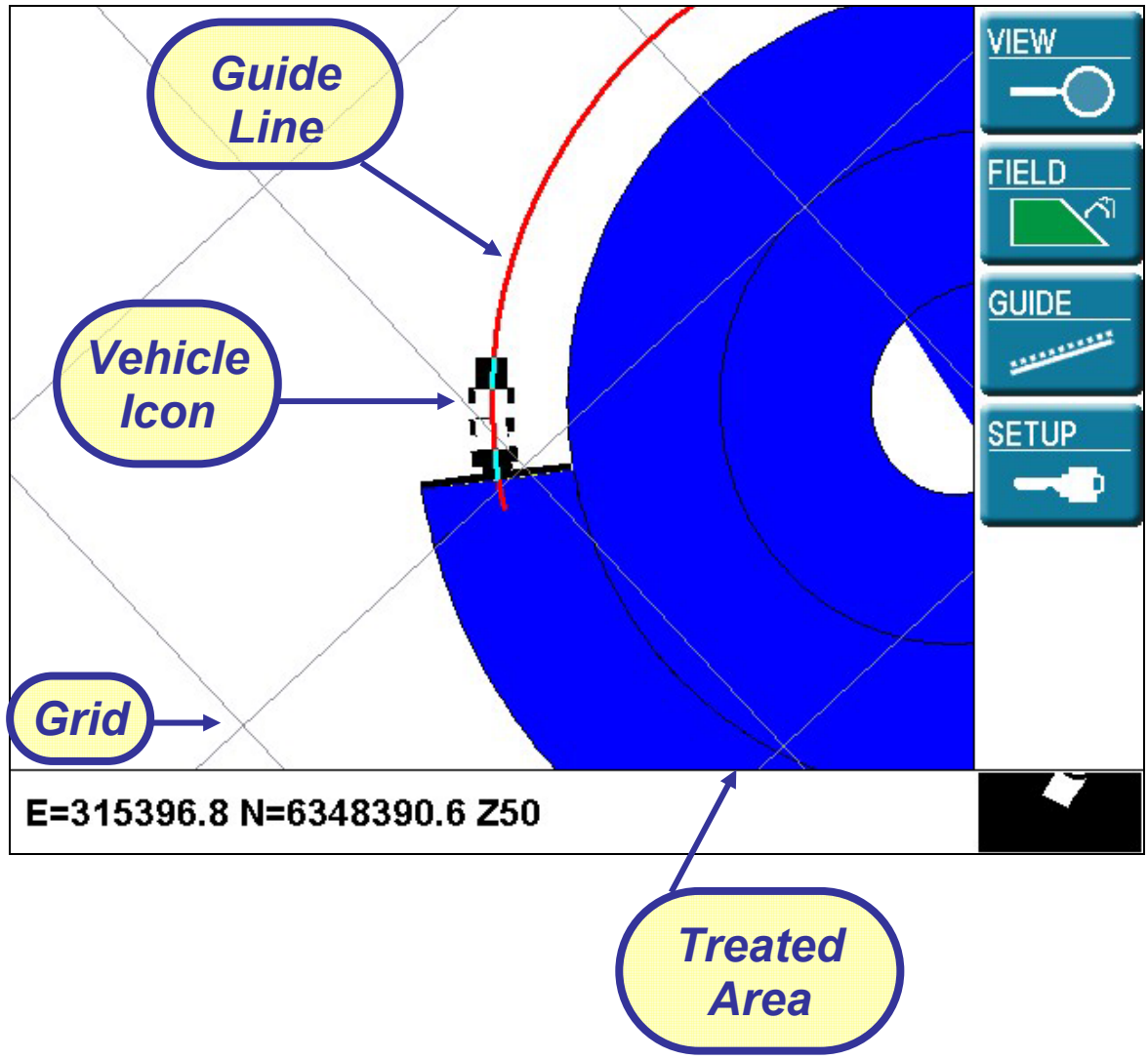


Figure 2-6: A typical Map Screen

Overview: The Map screen displays the following components:

Item	Description
Vehicle Icon	The Vehicle Icon represents the position of the rig in relationship to the treated areas. The Vehicle Icon will show all links that make up the current rig.
Guideline	A guideline will be displayed when either Lock or Parallel guidance is activated. The guideline is represented by a solid red line on the Map Screen that is used to guide the vehicle around the field.
Treated Area	When treatment is on, the treated area is recorded. This is then displayed on the Map Screen and is represented as the blue shaded area on the screen.
Grid	When the grid is on, grid lines will be displayed on the Map Screen. The grid lines run in a north-south, east-west direction.

2.5 Virtual Road Window

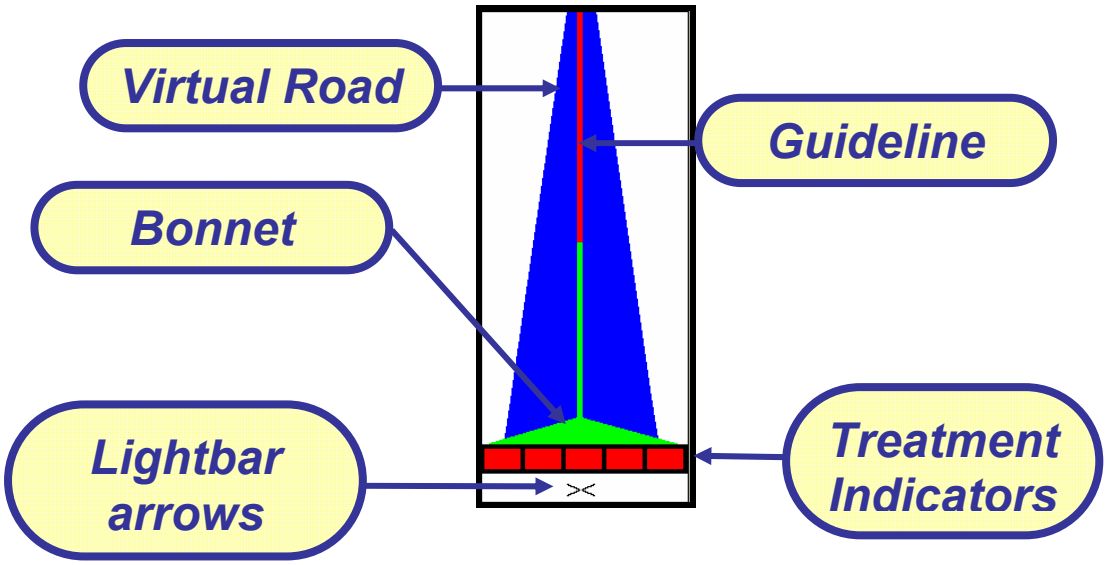


Figure 2-7: A typical Virtual Road Window

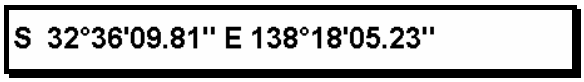
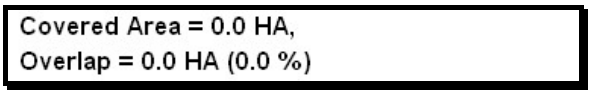
Overview: The Virtual Road Window is designed to represent a road from the position of driver looking across the bonnet to the guideline.

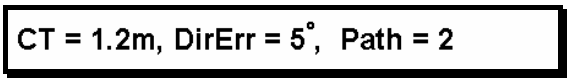
Item	Description
Virtual Road	The Virtual Road is represented by the blue roadway in the window. The Virtual Road does not represent the actual swath width of the boom, but rather the central portion of the swath.
Guideline	The guideline is represented by the red line in the centre of the blue Virtual Road.
Vehicle Bonnet	The green triangle in the Virtual Road window represents the front bonnet of a vehicle. The elongated line from the bonnet shows the vehicle alignment in relationship to the guideline. When the triangle is filled solid green it indicates that treatment recording is ON.
Treatment Indicators	The treatment indicator displays the number and current status of sections on a boom. A box filled red indicates that the section is ON, a blank box (white) indicates the section is OFF.

Item	Description
Lightbar Arrows	The lightbar arrows are displayed below the treatment indicators once guidance has been activated. The lightbar arrows indicate the distance from the vehicle to the guideline.
Grid	A grid will be displayed in the Virtual Road Window.

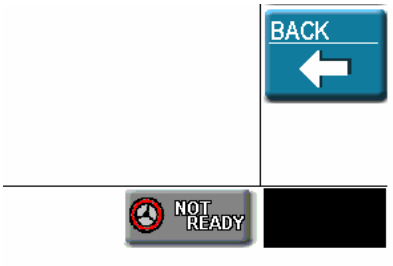
2.6 Status Bar

Overview: The Status Bar displays system status information as shown below. These messages can be set to be visible or invisible – see Section 6.4.5.

Item	Description
Position	 This displays the current position of the vehicle.
Treated Area	 This displays the current treated area. When one lap of the paddock has been completed, the total encompassed area will also be shown.
Area To Go	 This displays the total area minus the treated area.
Field / Vehicle	 This displays the number of the selected memory slot and the implement swath width.
Speed	 This displays the current vehicle speed.
% Overlap and Covered Area	 This displays the area covered and percentage of overlapped area in the current field. The covered area + overlap area approximately equals the treated area.

Item	Description
Guide Status	 This displays how many guidelines the vehicle is from the original guideline, and also whether the current guideline is to the left or right of the original guideline (or AB points).
Controller Info	 This displays information from a Third Party Controller if connected. If using touch or a RINEX toggle switch then it displays Manual.
AutoSTEER Info	 This display option is available when AutoSTEER is ON. It displays the distance from the current guideline, the angle the vehicle is travelling to the guideline and the current guideline number.
AutoSPRAY Status	 This displays whether AutoSPRAY is connected and if so, whether ON or OFF.

2.6.1 AutoSTEER Button



Overview: The AutoSTEER Button is displayed on the Status Bar when the option is enabled. The AutoSTEER button displays and controls the status of AutoSTEER. See Section 9.3 for more information.

2.7 GPS Status Indicator

Overview: The GPS Status Indicator displays the current status of the GPS or alarms. The indicator also selects the GPS Info window for additional GPS information. The states of the GPS Status Indicator are listed in the table below:

Icon	Description
	The satellite symbol scrolling through the icon indicates good GPS.
	The **DØ** alarm indicates good GPS, however the GPS is not corrected in any way (GPS only).
	The **ØG** alarm indicates poor GPS which is differentially corrected.
	The **DØG** alarm indicates no GPS.
	A totally blank GPS Status indicates that no data is being received at the GPS port.
	The View Mode indicates that GPS data is not used. The system will be in View Mode when the Field Menu is accessed.

2.7.1 GPS Status Window

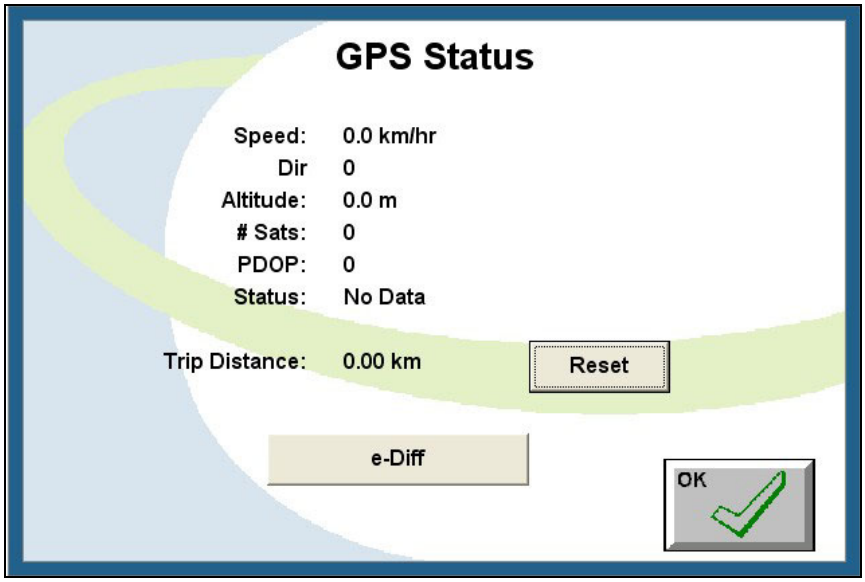


Figure 2-8: The GPS Info Window

Overview: The GPS STATUS window displays information related to the GPS. It displays information computed from the GPS.

Name	Function
GPS INFO	The GPS information displayed is detailed as; • Speed: The current vehicle speed. • Dir: The current vehicle direction displayed as an azimuth (angle relative to North). • PDOP: The PDOP (Position Dilution of Precision) is a measure of the positioning quality. The PDOP value should be less than 4 for accurate positioning. • Altitude: The altitude of the vehicle above sea level. • # Sats: The number of GPS satellites observed. • Status: Displays the current GPS status, also indicated by the GPS Status Icon.
Trip Distance	The trip distance is an odometer as recorded by GPS.
Reset	The Reset button resets the trip distance back to 0.00Km.

Name	Function
e-Dif	The e-Dif button (optional purchase) turns differential mode off and swaps the MiniMAX receiver from marine beacon to e-Dif mode and calibrates it.
OK	The OK button closes the GPS Status window.

2.8 Registering the System

The Saturn “H” guidance system is configured for specific user requirements via a password. Hence prior to use the system must be configured with the correct code to register the options on the system.

The system has been supplied from RINEX with a password in accordance with the options ordered at time of purchase.

The six character code must be entered in the REGISTER window.

Access: **SETUP** **ABOUT GUIDETRAX** **REGISTER**

The password will be supplied with the following information;

- Serial number of the Saturn “H” interface controller unit
- Compact Flash Identification Number (CFID)

If the supplied information does not match the CFID, contact RINEX or their Authorised dealer as the password will not function.

2.9 Setting Up The First Time

The following list of settings must be set for correct guidance and mapping prior to using GuideTRAX V3. These parameters must be set each time the system is moved between vehicles. Failure to set these parameters correctly may provide incorrect guidance and mapping information.

2.9.1 Setting The Season

Prior to using the HT for the first time it is necessary to setup information pertaining to the cropping season.

Access: **SETUP** **MORE** **MEMORY SETUP** **SEASON** **NEW**

1) A warning message will be displayed stating that all treatments for the current season must be completed. As this is the first time the system has been used, touch **OK**.

2) Type in the new season (usually the current calendar year) using the on-screen keyboard and touch **OK** **BACK** **BACK** **BACK**.

2.9.2 Setting Up Vehicles

Prior to using the “H” system for the first time it is necessary to setup information pertaining to the vehicle and peripherals including the boom and its sections.

Access: **SETUP** **VEHICLE** **LINK SETUP**

The default Link Setup list screen will be displayed as shown in Figure 2-9.

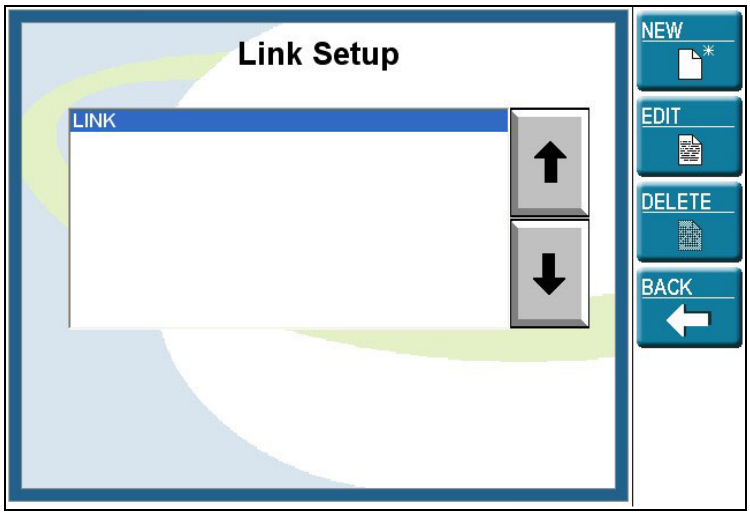
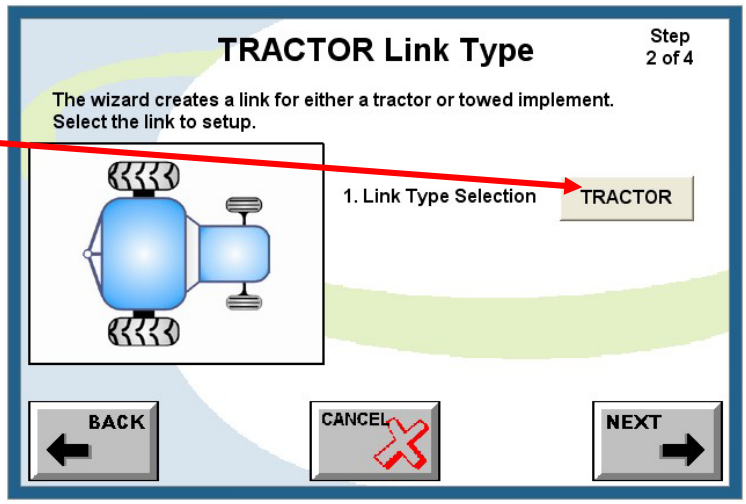


Figure 2-9: Default Link Setup Screen

1) Press **NEW** to enter a new vehicle. Type in the new link name (usually the tractor or implement model) using the on-screen keyboard and touch **NEXT**.

2) Select whether this link is a Tractor or Implement by touching the **TRACTOR** button.



Hints and Tips:

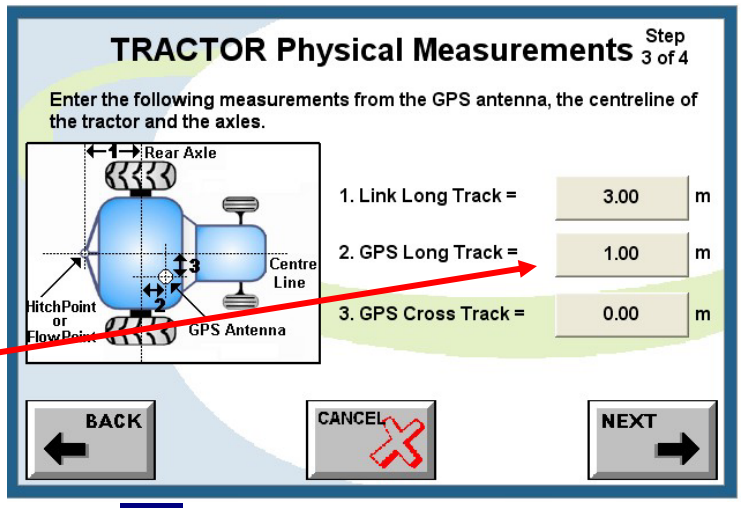
- *The vehicle or machine which has the GPS receiver/antenna installed on it must always be set as the TRACTOR.*

3) Touch **NEXT**

4) For each of the Physical Measurements shown on the screen measure corresponding distances on the tractor or implement.

5) Touch the corresponding button on the screen.

6) Type in the measurement using the on-screen keyboard, then touch **OK**.

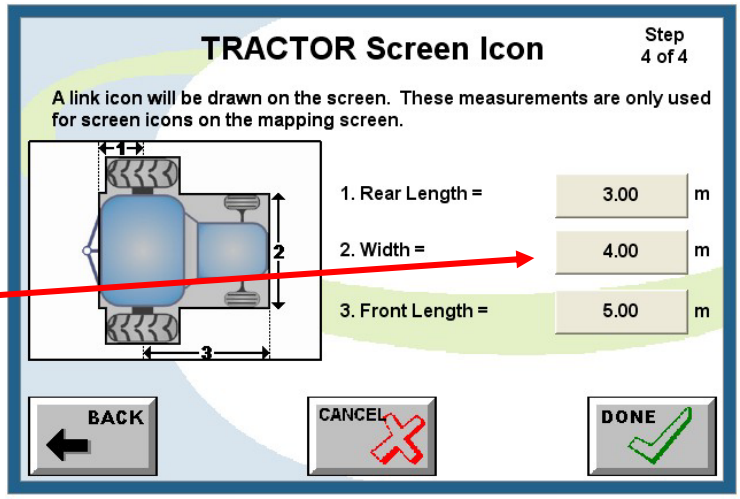

TRACTOR Physical Measurements
Step 3 of 4
Enter the following measurements from the GPS antenna, the centreline of the tractor and the axles.
Rear Axle
Centre Line
HitchPoint or FlowPoint
GPS Antenna
1. Link Long Track = 3.00 m
2. GPS Long Track = 1.00 m
3. GPS Cross Track = 0.00 m
BACK
CANCEL
NEXT

7) When all the measurements for this window have been entered touch **NEXT**.

8) For each of the Screen Icon measurements shown on the screen measure corresponding distances on the tractor or implement.

9) Touch the corresponding button on the screen.

10) Type in the measurement using the on-screen keyboard, then touch **OK**.


TRACTOR Screen Icon
Step 4 of 4
A link icon will be drawn on the screen. These measurements are only used for screen icons on the mapping screen.
1. Rear Length = 3.00 m
2. Width = 4.00 m
3. Front Length = 5.00 m
BACK
CANCEL
DONE

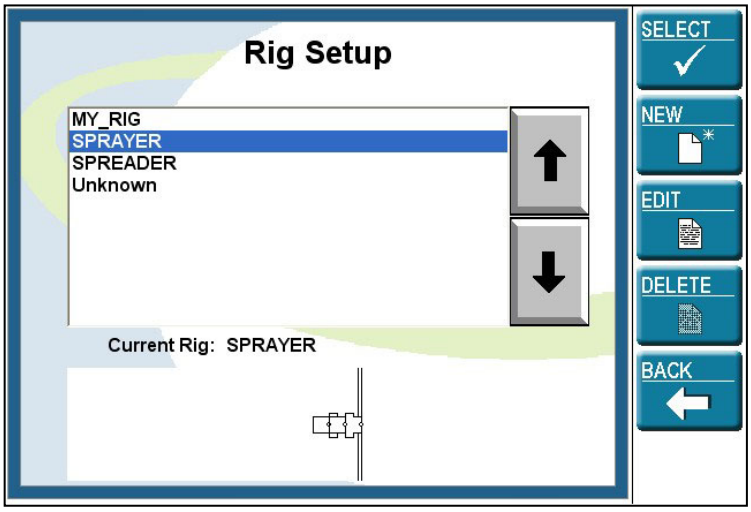
11) When all the measurements for this window have been entered touch **DONE**.

12) If another link needs to be created, touch **NEW**.

13) Repeat steps 1 to 11 for as many links (tractors or towed implements) as necessary.

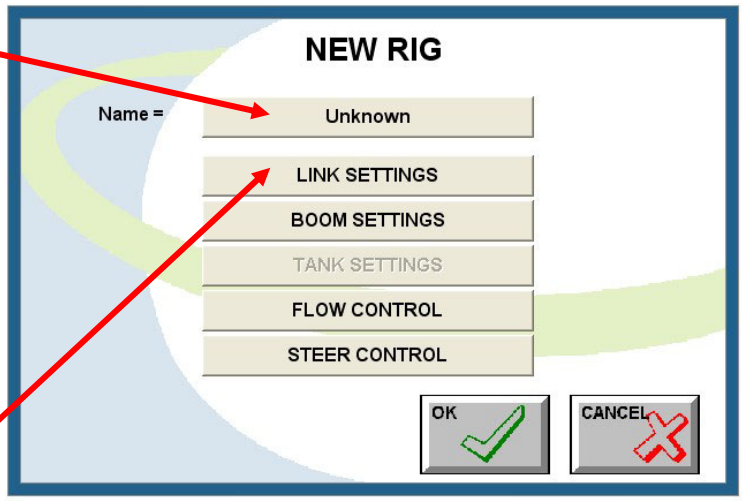
14) Touch **BACK** and then touch the **RIG SETUP** button.

15) Touch **NEW**.



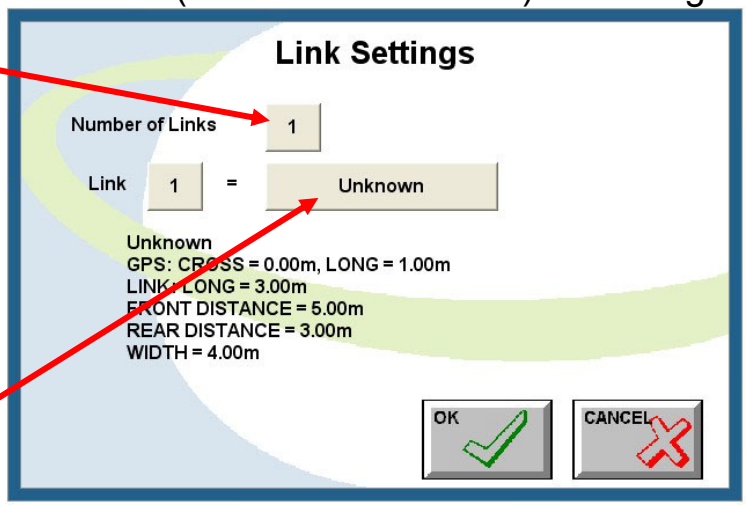
16) Touch the "Name =" button and enter the name of the rig (usually something which will represent the function of the rig, e.g. "Sprayer") then touch **OK**.

17) Touch the **LINK SETTINGS** button.



18) Touch the Number Of Links button (total number of links) and using the ↑ ↓ buttons select the total number of links that will be used in the rig, then touch **OK**.

19) Touch the **UNKNOWN** button, then using the ↑ ↓ buttons select the first link to be used in the rig, then touch **OK**.

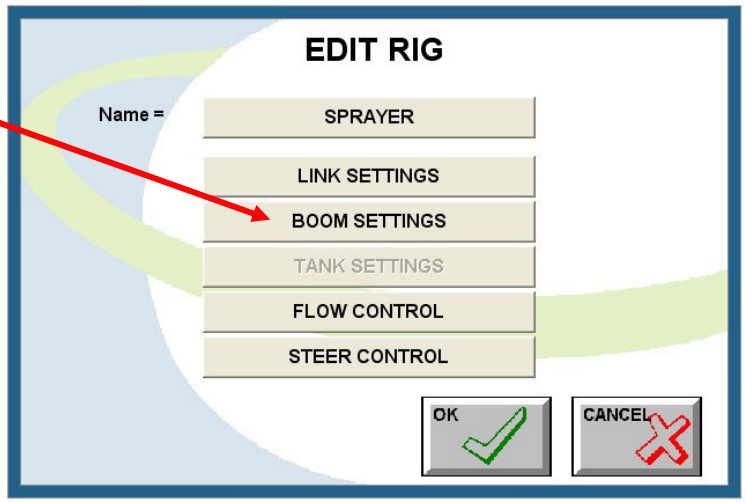


20) If necessary touch the Link (number) button to move to the next link in the rig and repeat step 19).

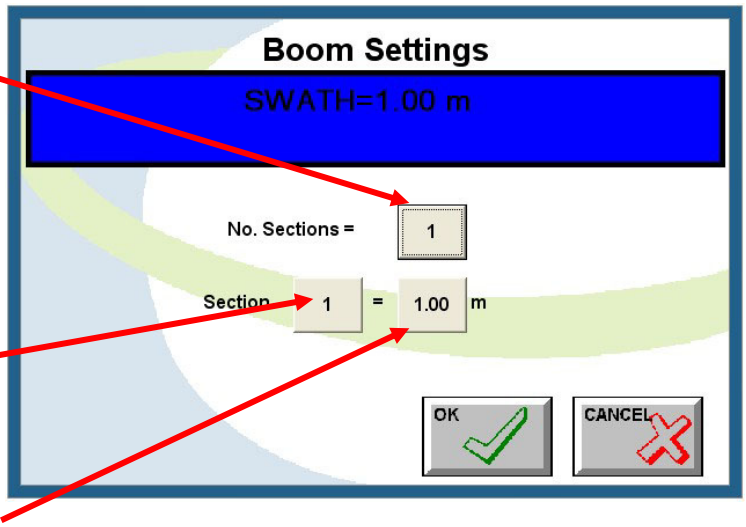
21) When all links for this rig have been included in the correct order, touch **OK**.

2.9.3 Setting Up The Boom

1) Touch the **BOOM SETTINGS** button.



2) Touch the No. Sections button
3) Use the ↑ and ↓ buttons to select the total number of sections that will be used on the boom, then touch **OK**.
4) Touch the Section button to select each section.



5) Touch the section width button to set the width of each section.
6) Use the on-screen keyboard to type in the width of the selected section and touch **OK**.
7) Repeat steps 1 to 6 until all section widths have been set. The total swath width is displayed at the top of the screen.

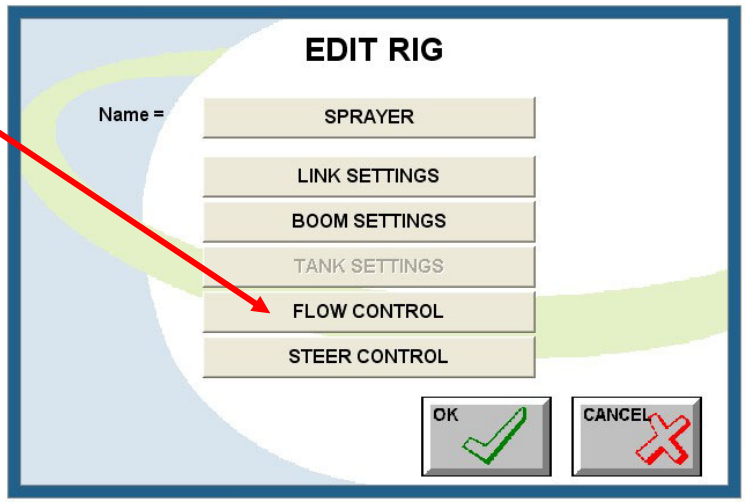
Hints and Tips:

- *If you do not have AutoSPRAY (see Section 8) or a Multi-Section Boom Interface (see Section 6.8) or any spray controller listed in the Flow Controller list, then you may find it more convenient to set the number of sections to 1 and treat the whole boom as just one large section.*

8) Touch **OK** when boom settings are complete.

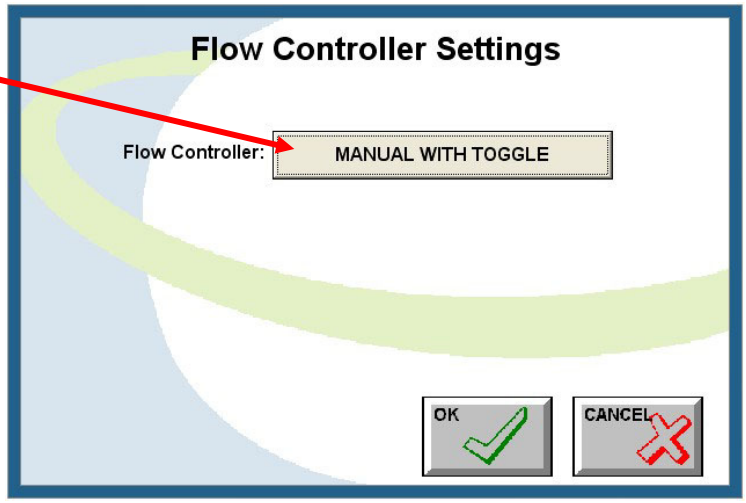
2.9.4 Setting Up Master And Section Switches

9) Touch the **FLOW CONTROL** button.



10) Touch the Flow Controller button

11) Using the ↑ ↓ buttons to select the spray or spread controller or method which will be used for turning treatment recording on and off.



Hints and Tips:

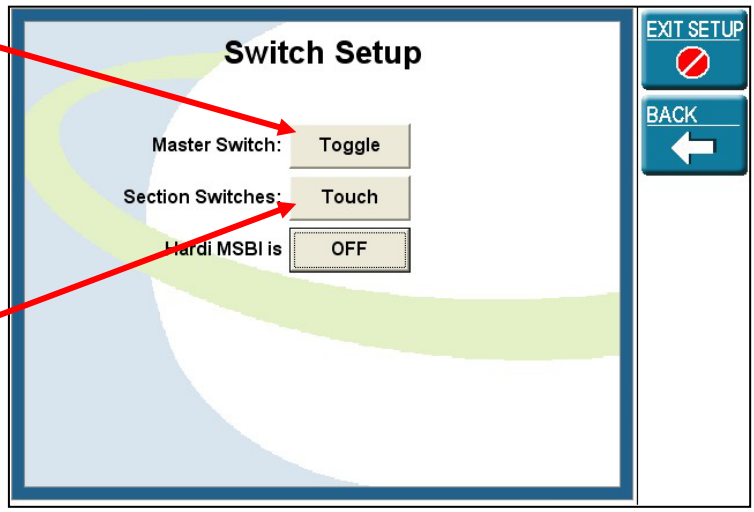
- *If using the Rinex toggle switch to turn recording on/off, select MANUAL WITH TOGGLE.*
- *Only select a flow controller if the Saturn "H" system is physically connected to the controller with a serial cable.*

12) Touch **ACCEPT**.

13) Touch **OK** **OK**

14) Touch the **SWITCH SETUP** button.

15) Set Master Switch to the method that will be used for turning treatment recording on/off (Touch if touching the screen or Toggle if using the Rinex toggle switch) See Section 6.5 for more information.



16) Set the Section Switches to Touch, then touch **EXIT SETUP**.

2.10 Connecting the GPS

While GuideTRAX V3 is starting, the attached GPS receiver may need some time before becoming fully operational. If the system is new it is most likely that the GPS has not been powered up since initial factory testing. Hence the GPS Status indicator may show a warning, or an alarm message while the GPS receiver gathers new information about the visible satellites.

While this process is occurring the GPS Status Indicator, located in the lower right hand corner of the main screen and illustrated in Figure 2-10 may show an alarm status (See Section 2.7 for more details). When the GPS Status Icon changes to the scrolling satellite, the receiver is ready for normal operation.

Figure 2-10: The GPS Status Indicator with Satellite Icon

2.11 Recording a Treatment

GuideTRAX V3 is designed to record information when the vehicle is operational, such as when a boom spray is actually spraying chemical or a spinner spreader is spreading fertiliser. This manual refers to this operation as a treatment, however it is sometimes also referred to as a coverage area in other publications.

In order to record when a treatment is being applied or when the vehicle is in transit it is necessary to switch between the recording and transiting mode.

The Saturn "H" system can be configured to start and stop recording via three different methods:

- **SCREEN** The screen can be used as the switch by touching either the bonnet on the Virtual Road Window or the Vehicle Icon on the Map Screen. Touching either of these points will then reverse the action.
- **TOGGLE** The RINEX Toggle switch is connected to the "H" interface controller and the switch can be turned ON or OFF. Additionally the RINEX Toggle can be wired to peripheral devices which supply a 12vDC switch when the treatment is ON (eg. a spray rate controller solenoid), see Section 6.5.1 for further details.
- **EXTERNAL** The "H" system is compatible with a number of peripheral controllers which communicate with the interface controller via a computer protocol. It will be necessary to confirm compatible controllers with RINEX.

To start and stop recording use the method that has been setup in Section 2.9.4 Setting Up Master And Section Switches.

3

Vehicles & Booms

GuideTRAX V3 software incorporates advanced vehicle modelling software to ensure that the recorded treatment areas are truly correct. It is particularly relevant as further advances in GPS accuracy become available and automatic control of treatment application is adopted.

GuideTRAX V3 can accurately model a spray boom or any implement which is towed by a tractor. In order to perform these calculations it is imperative that the measurements of the vehicle and GPS antenna are accurately recorded.

GuideTRAX V3 is designed to allow numerous plant and equipment used on the farm to be entered into the database for selection of a rig that may be used for seeding, spraying or any operation where the guidance system is used.

Link: Each item of plant and equipment is a different link (a tractor, truck, tank and boom are all individual links).

Rig: Each rig is made up of one or more links selected from a list, up to a maximum of five.This concept is illustrated in Figure 3-1 which shows three links to assemble one rig.

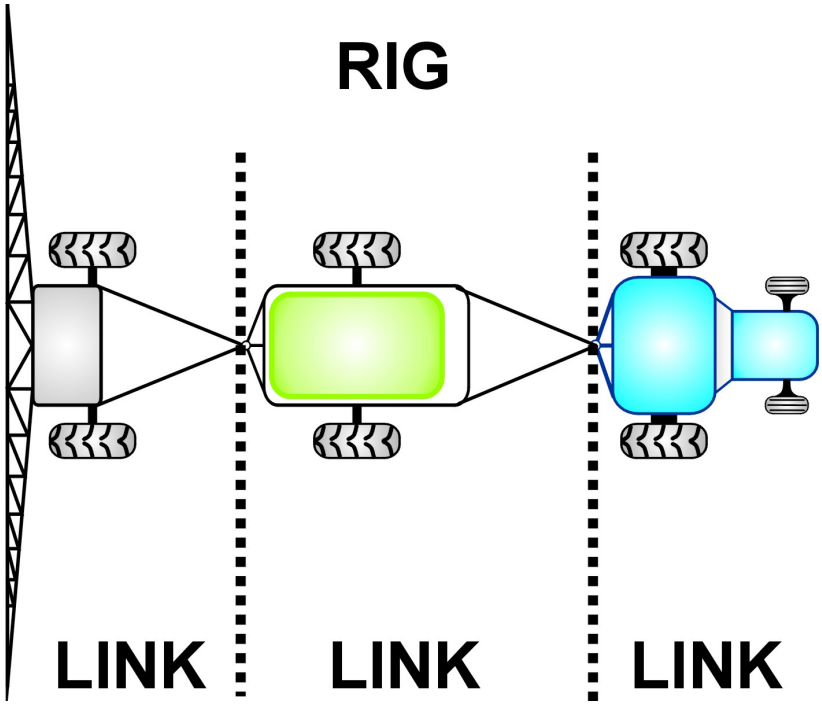


Figure 3-1: Rigs and Links

3.1 Configuring The Vehicle

Access: **SETUP** **VEHICLE SETUP** **LINK SETUP**

The first link that will be used in the assembly of a rig will be the vehicle. The vehicle may comprise several different types including, a conventional tractor, truck, an articulated tractor, or a self propelled boom spray.

The different characteristics specific to individual vehicles are described in the following sections.

3.1.1 Tractor

The term "vehicle" is used generally in this manual to describe the link at the front of a rig. The vehicle may be either a tractor, truck or any other vehicle which is used for towing other plant or for applying treatment. In GuideTRAX V3, the TRACTOR is defined as the vehicle which has the GPS receiver/antenna mounted on it.

The measurements for the vehicle are illustrated in Figure 3-2. The measurements from the GPS antenna to the centreline of the axles, vehicle, and the hitch point will need to be recorded and entered into V3.

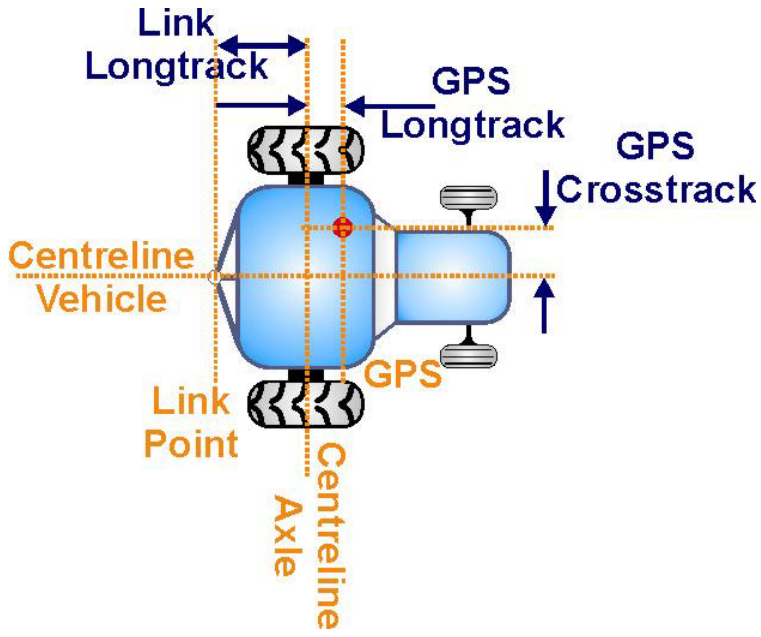


Figure 3-2: Tractor & Measurements

3.1.2 Articulated Tractor

The articulated tractor is a combination of two links. In order to enter the details of an articulated tractor it will be necessary to enter the measurements as indicated in Figure 3-3.

If the GPS receiver/antenna is mounted on the front half of the tractor, it will be entered as the first link in the rig, and the second half will be entered as the second link in the rig. If the GPS were mounted on the second half of the tractor, then it would be Link 1, and the front half of the tractor would be ignored, as if it did not exist – the measurements of the first half of the tractor would not be entered into GuideTRAX.

Note that the GPS Longtrack measurement must be entered as a negative value if it is behind the front axle as shown in Figure 3-3

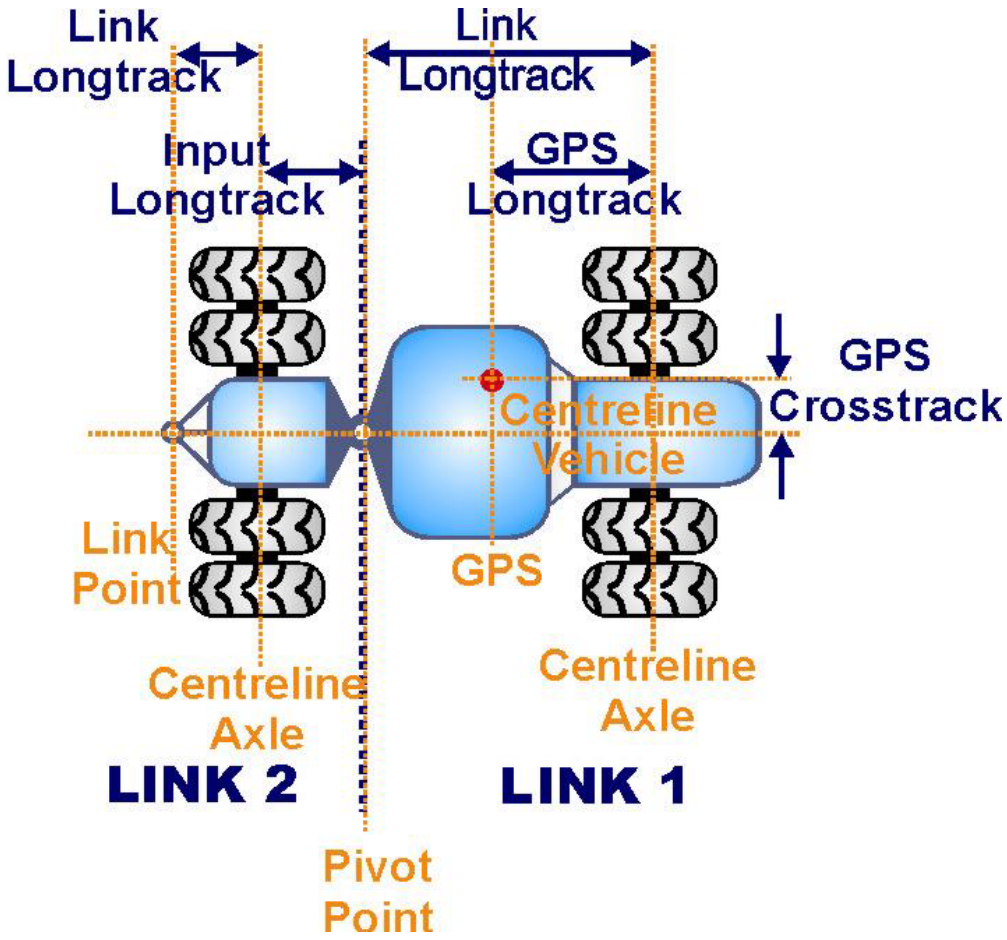


Figure 3-3: Articulated Tractor

3.1.3 Self Propelled Sprayer

The self propelled sprayer is treated as one link with the boom spray attached at the pivot point. In addition, self propelled sprayers may also have the boom attached to the front of the vehicle. In this situation the Link Longtrack measurement to the boom will be a negative value. These measurements are illustrated in Figure 3-4.

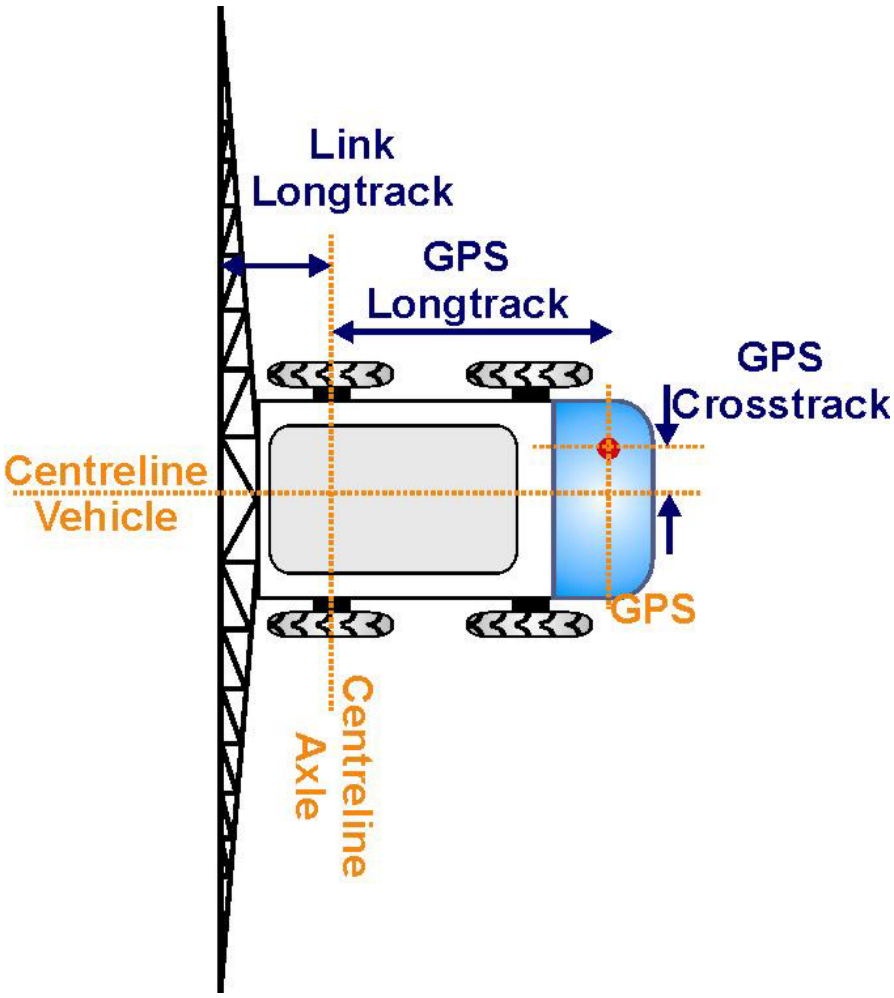


Figure 3-4 Self Propelled Sprayer

3.2 Configuring The Towed Implement

Access: **SETUP** **VEHICLE SETUP** **LINK SETUP**

The second or trailed link in a rig is typically of one or two varieties. Commonly referred to as a Pig or a Dog trailer, their characteristics and measurements are detailed below.

3.2.1 Pig Trailer

The Pig or the conventional trailer is very simple to model. The trailer may have one or more fixed axles which are all located at the rear of the trailer. This is illustrated in Figure 3-5.

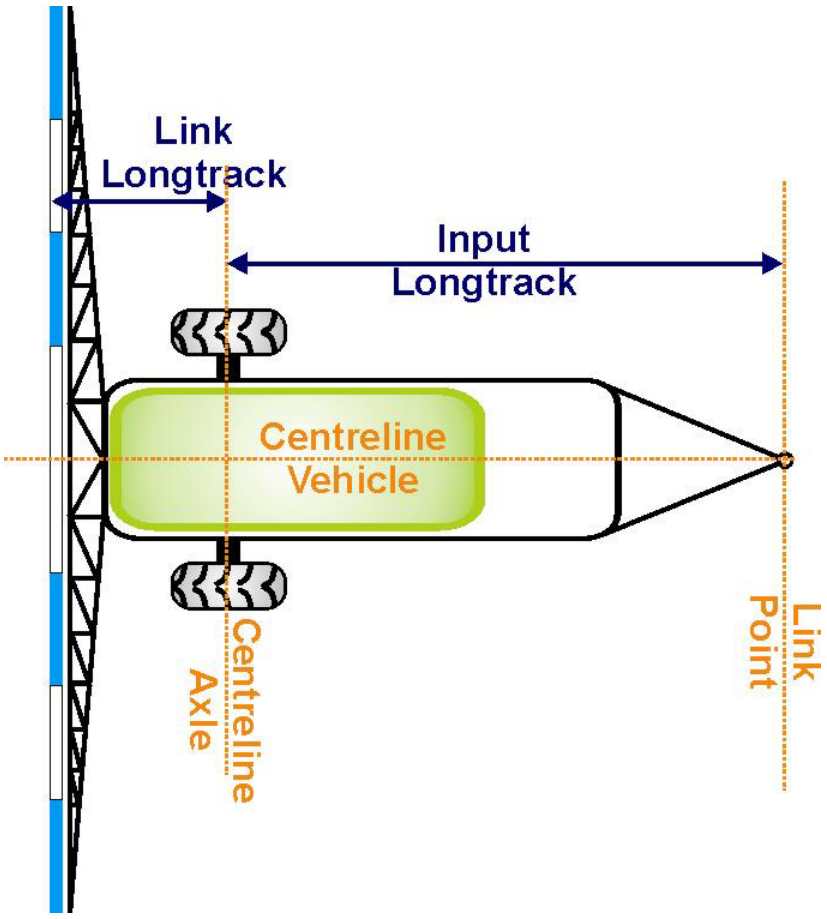


Figure 3-5 Conventional Trailer

If the trailer has a group of axles (e.g. four fixed axles at the back), then the Link Longtrack measurement must be measured from the centre of the group of axles to the rear flowpoint or hitch point.

3.2.2 Dog Trailer

The Dog trailer is similar in concept to the articulated tractor as it comprises two links. The trailer has at least two axles with the leading axle being mounted on a turntable as illustrated in Figure 3-6.

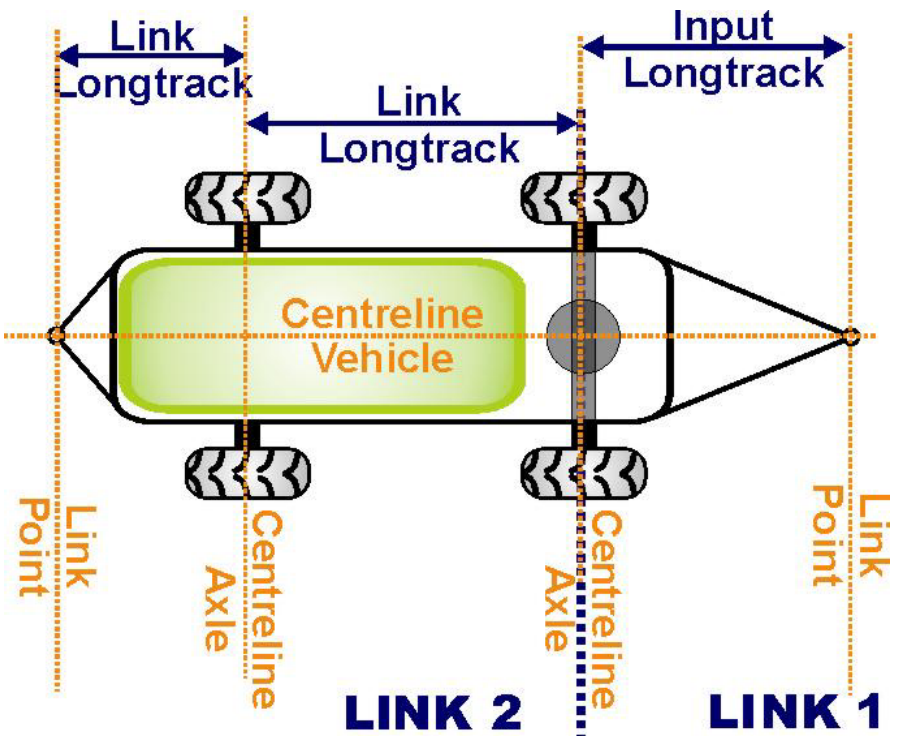


Figure 3-6 Dog Trailer Layout

When entering information for the two links the front section of the trailer must be entered as the first of the two links that make up the rig. The front section of the trailer will have an Link Longtrack measurement of 0.0 metres.

If the trailer has a group of axles (e.g. two fixed axles at the back), then the Link Longtrack measurement must be measured from the centre of the group of axles to the rear flowpoint or hitch point.

3.3 Configuring the Rig

Access: SETUP VEHICLE SETUP RIG SETUP

The Rig comprises one or more links. The Rig also defines the boom or swath width, the tank capacity, the flow controller and steering controller used in the makeup of the Rig.

3.3.1 Configuring the Boom Settings (Swath Width)

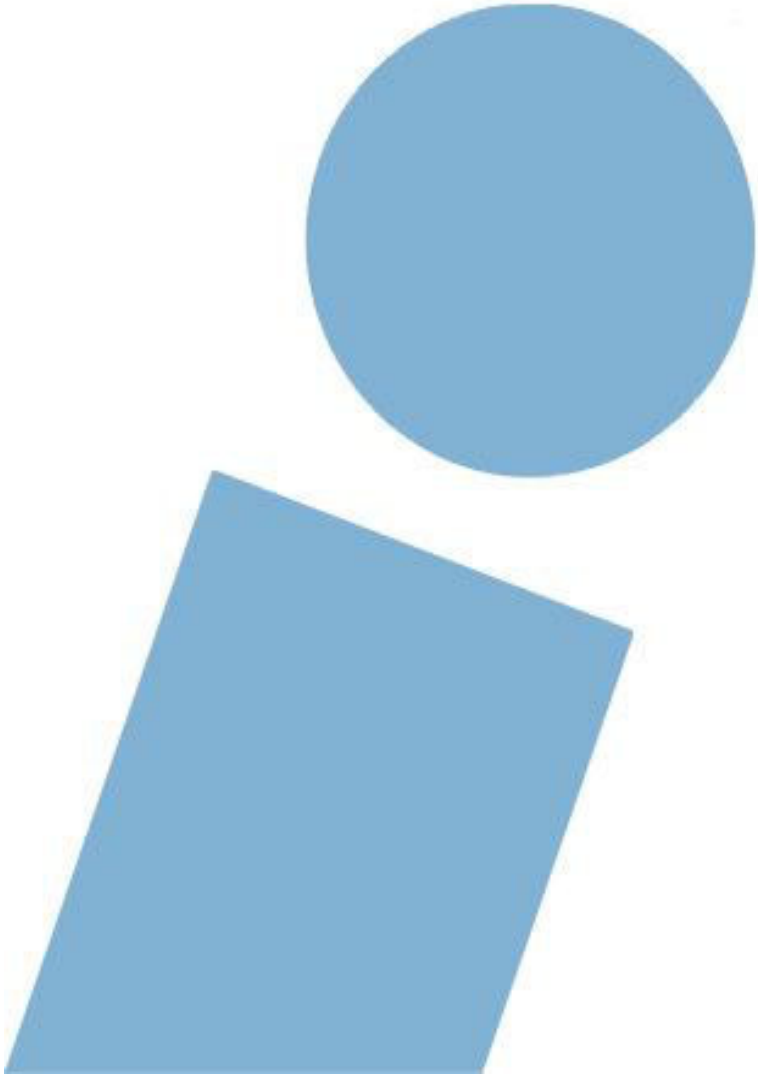
Access: SETUP VEHICLE SETUP RIG SETUP BOOM SETTINGS

The swath width of the rig represents the actual width of the treatment applied. Hence the swath width may represent the width as applied from a spreader, or may apply to the width of a spray boom.

When a spray boom is used the boom settings may be divided into sections to represent the actual boom spray. The boom settings, the number of sections and their respective widths may be configured in the Edit Rig Window.

4

Fields & Virtual Memory



4.1 Virtual Memory

GuideTRAX V3 automatically saves field information whilst the system is operational. This information is saved in the onboard Virtual Memory. The Virtual Memory will retain the information on the treatment area until such time that it is cleared from the Virtual Memory. Furthermore the information is retained regardless of whether the system has been shutdown or not. Accordingly a field can be left unfinished and completed at a later date by using the Virtual Memory.

Access: **FIELD** **MEMORY**

There are nine Virtual Memory slots in all models of GuideTRAX V3, as illustrated in Figure 4-1. As product treatment is recorded, the information is saved in the selected Virtual Memory slot. It will stay in the selected slot until it is either saved by touching the **ARCHIVE** button, or the field is restarted.

Each of the nine Virtual Memory slots can be occupied by unfinished treatment data at any one time.

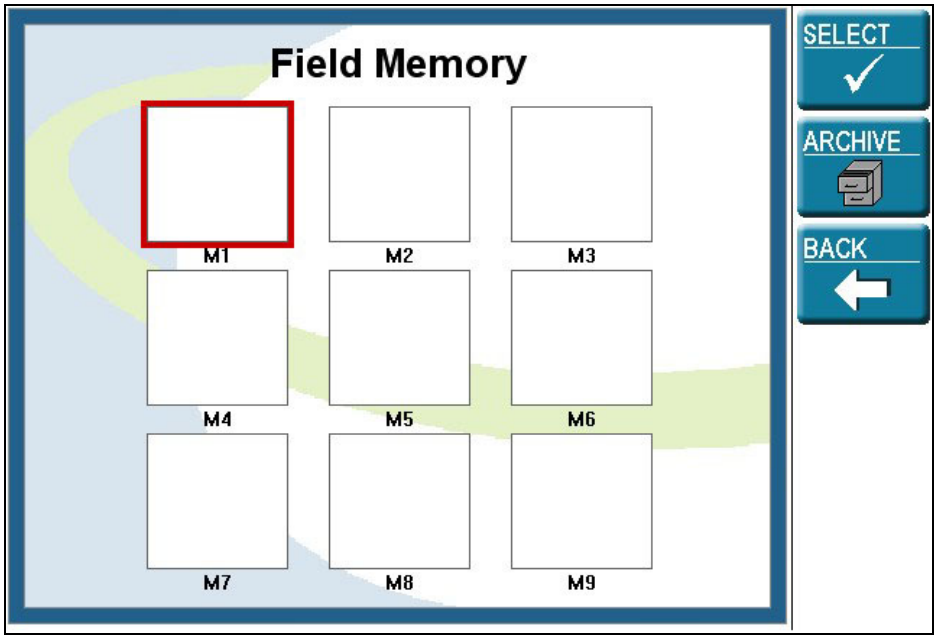


Figure 4-1: Field Memory Window

4.2 Setting Up the Season

In order to record information so that it may be easily retrieved in the future it is necessary to have a logical database system.

Each field will be saved in the current season so the current season must be set up and selected before starting a treatment in a particular field.

See Section 2.9.1 for instructions on creating the season.

4.3 Starting a New Field

1) When a new treatment is being started in a field, a Virtual Memory slot must first be selected – touch **FIELD** **MEMORY**

2) Select any empty Virtual Memory slot, or, if none are empty, choose one which is no longer required.

3) If the Virtual Memory slot has a thick red line around it as shown around M2 in Figure 4-2, then it has been selected.

4) Touch **SELECT** **RESTART** **OK**. This will clear any previous treatment data from the selected Virtual Memory slot and set the boom width to the current vehicle.

5) Treatment can now be started.

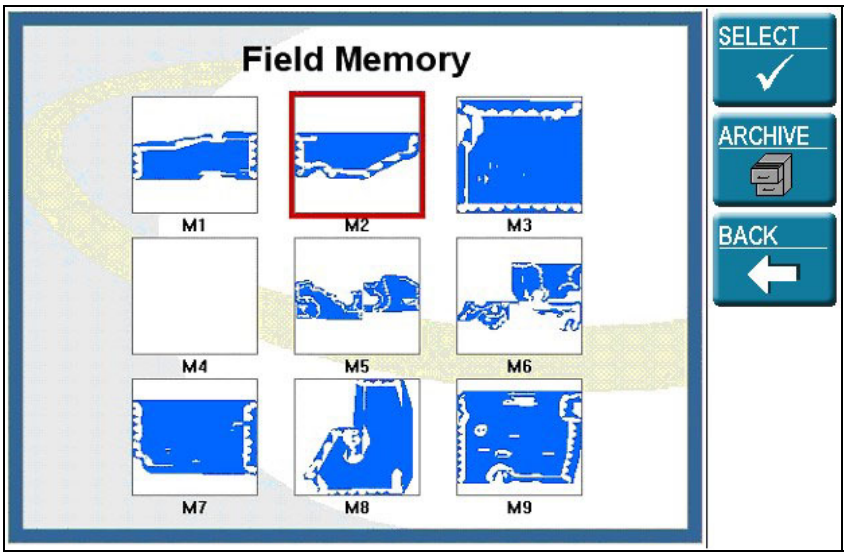


Figure 4-2: Field Memory Window

4.4 Saving a Field

Once a treatment has been completed in a field, the information can be saved to that field's history. The information is then available to be copied and exported from the GuideTRAX system.

1) Turn treatment recording off.
2) Touch **FIELD MEMORY**.
3) Select the virtual memory slot containing the finished treatment.
4) Touch the **ARCHIVE** button.
5) A message will be displayed asking for a name to either be selected from a list or created. Touch **OK**.
6) The SELECT FIELD Window will then be displayed. Either select an existing field name from the list, or create a new field name by touching **NEW**.
7) If a new name is typed in, touch **OK**.
8) On the SELECT FIELD Window, touch **SELECT** once the correct field name has been selected.
9) A message stating "Treatment successfully finished" will be displayed.
10) Touch **OK SELECT**.

4.5 Viewing Field Information

Once the information has saved as described in Section 4.4, it can be viewed in History.

Access: **RECORDS** **HISTORY**

1) A list of all fields will be displayed, as shown in Figure 4-3. If the field has been treated several times in the current season, it may appear in the list several times.

2) More details about treatment recorded in the field can be seen by first touching the line of field information to select it, then by touching **PROPERTIES**.

3) Touch on each of the information tabs along the top of the Treatment Properties screen to see more information about the treatment applied to this field. Note that **Filter** and **Map View** information is not available in the HT version.

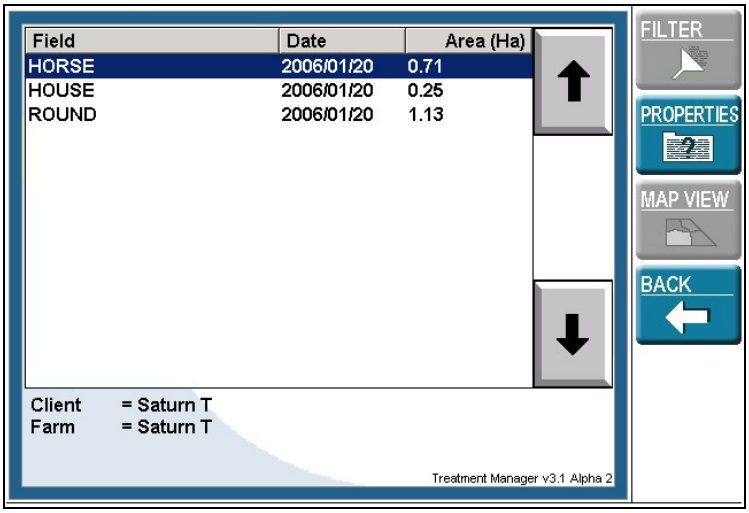


Figure 4-3: **Field History Window**

4.6 Unarchiving An Archived Field

When a field has been Archived it is removed from the virtual memory and no further treatment information can be added to it. Also, the actual treatment map is no longer available for viewing.

The field can be Un-archived by touching **RECORDS** **HISTORY** **PROPERTIES** **EDIT** (tab) **UN-ARCHIVE FIELD** as shown in Figure 4-4. This will remove it from the History list and return it to the virtual memory, where it will be displayed with the saved field name.

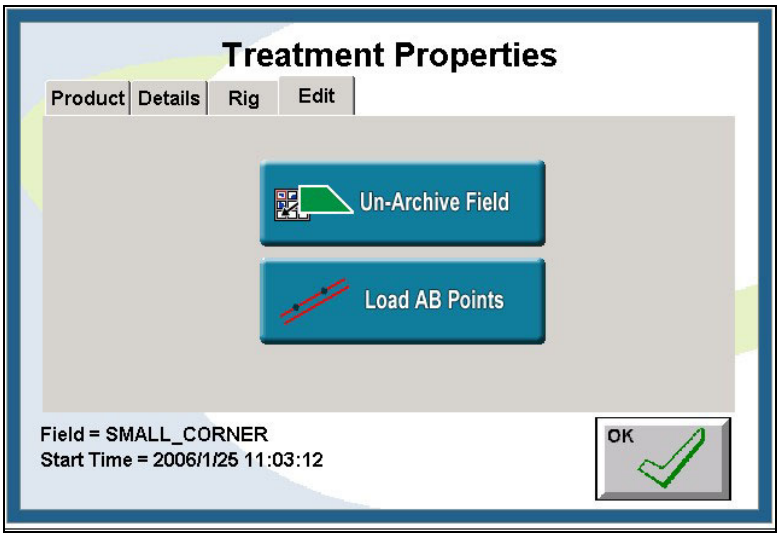


Figure 4-4: **Treatment Properties Window**

Next time it is archived, a field name will not be requested. Instead the field will be moved from the Field Memory to the Records History List.

Note: If the Un-Archived field is restarted it will be permanently lost..

4.7 Transferring and Backing Up Saved Fields

Fields which have been saved can be copied to a USB device (USB drive or compact flash card reader + compact flash card):

1) Copy any information on the USB device which needs to be kept to a safe place, as any pre-existing information will be deleted when transferring field data from the Saturn “H” interface unit.

2) Insert the USB drive into the USB port on the Saturn “H” interface unit.

3) Touch **SETUP** **TRANSFER FILES** **EXPORT FILES**

4) A progress bar will appear will appear while information is copied, then a message will appear: " Export Completed Successfully". Touch **OK**.

5) Touch **BACK** **BACK**.

5

Using Guidance

A major feature of GuideTRAX V3 is the ability to provide guidance to the vehicle operator so that treatment can be applied to a field as accurately as possible. In order to treat an entire field the operator will want to ensure that no areas are missed and minimise over lapping areas. Due to the never-ending shapes of fields a number of different spraying techniques have been developed.

These techniques, as shown in Figure 5-1 are summarised as follows.

- **Parallel lines** Perfectly straight lines that are parallel to each other.
- **Racetrack** Lines that are in an ever decreasing shape. The pattern is not necessarily a square or circle.
- **Contour lines** Lines that are parallel, however they are not straight. These lines are typically found around contour banks.

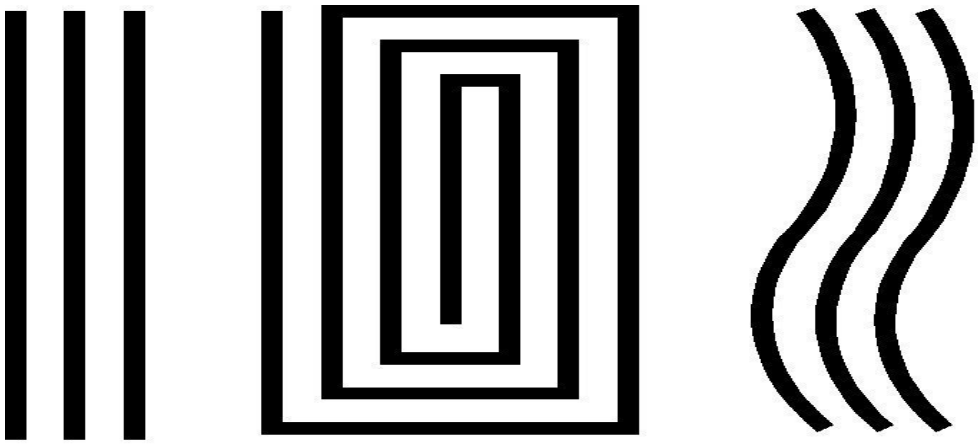


Figure 5-1: Typical patterns used in treating fields Parallel Lines, Racetrack and Contour lines.

It is not the intention of GuideTRAX V3 to decide which method is superior as each operator has their own preferences as to which method they use for a given field. More importantly, it should be noted that the operator could use any of these techniques, or a combination, for guidance in applying a treatment to a field.

5.1 Creating a Guideline

A basic principle of GPS guidance is to create a guideline for the system and operator to follow. The guideline maybe straight or curved depending upon user requirements. Once created the guideline is represented on the map screen as a red line.

In order to create a guideline there are two basic principles to consider. Firstly for straight parallel lines it is necessary to define two points and the guideline is created between these points as shown in Figure 5-2.

Figure 5-2: Guideline with Points A and B

Alternatively a guideline can be created to follow alongside an existing treated area which maybe curved or straight. The guideline is created one swath width away from the existing treatment. This is shown in Figure 5-3.

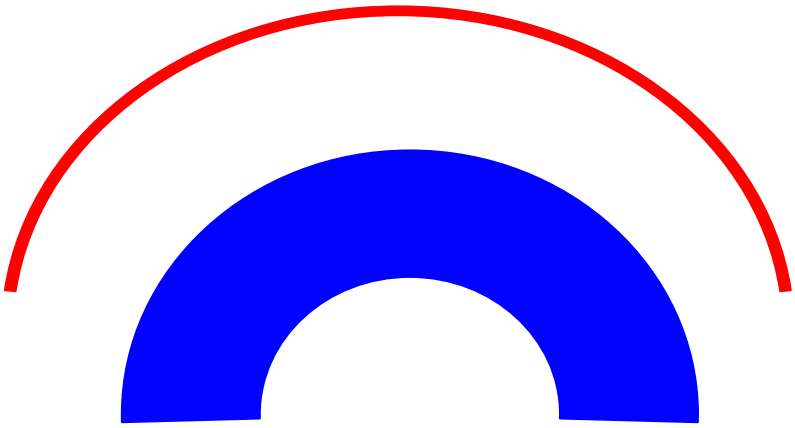


Figure 5-3: Guideline along Curved Treatment

5.1.1 Parallel Guidance

Treating a field using the parallel method is very simple. As previously described, the parallel method is for straight lines only and consequently the first task is to set out a straight line to work from. This is easily achieved by defining one point at one end of the field and one at the other end and connecting the two points with a line. This is termed either the base or key line. From this line, the next parallel guideline is calculated to be across one swath width minus any guide overlap distance entered, see Section 5.3.1. GuideTRAX V3 automatically calculates these parallel guidelines as the vehicle moves around the field. A typical parallel spray pattern is shown in Figure 5-4.

Figure 5-4: A typical spray pattern using parallel guidance. Points "A" and "B" define the base line for all other parallel lines.

The points "A" and "B" should be as far apart as practical to minimise errors in determining the base line. Ideally, the points should be located prior to commencing spraying so that the actual spray pattern along the base line is truly straight. Once the base line is defined, the operator simply needs to follow the indicators on the light bar to stay on-line.

As one swath line is finished and the spray boom is turned off to turn back to start the next pass GuideTRAX V3 will automatically increment to the next parallel line. Swath lines can be sprayed in any order and GuideTRAX V3 will show the nearest parallel line to the vehicle. Swath lines will not be missed, as the treated area on the map screen will always show exactly which areas have been treated and the areas that haven't.

In order to use parallel line guidance, press the **POINT A** button on the Guide Menu. A dot will appear on the screen representing point A. The

POINT A button will now turn into the **POINT B** button. Once pressed it will create the second dot on the screen.

The **POINT B** button will now turn into the **POINT A** Button.

Press the **PARALLEL** button to draw the projected parallel line and activate parallel guidance. The Parallel guidance can be deleted/deactivated on this line by touching the **GUIDE OFF** button or press **POINT A** to redefine a new line (The system will prompt whether to create a new point A or cancel).

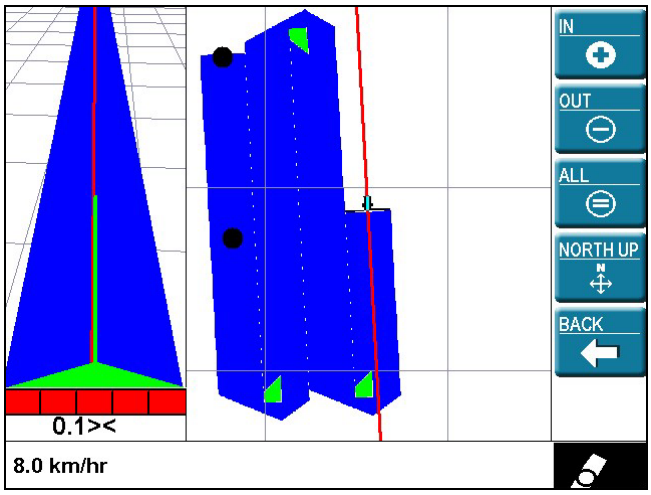


Figure 5-5: Parallel guidance

5.1.2 Racetrack (Lock) Guidance

The racetrack guidance method is called lock guidance because instead of using a pre-defined line, the system “locks” on to a previous swath when calculating the guideline for the next run.

This method of guidance is also very simple. The operator merely has to drive around the perimeter of the field as usual. Typically the outside perimeter would be governed by a fence line that dictates the shape of the field, this may be rectangular or some irregular shape. This is not important to GuideTRAX V3, as the next swath line will be adjacent to the last swath by the distance of one swath width minus any guide overlap distance, see Section 5.3.1. Once again, this is not important as GuideTRAX V3 automatically calculates this for the operator. A typical racetrack spray pattern is shown in Figure 5-6.

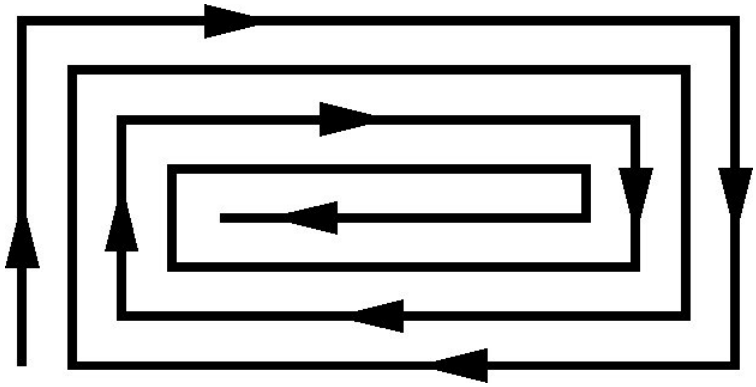


Figure 5-6: Typical Spray Pattern using Racetrack

Once the perimeter of the field is completed the vehicle moves towards the next swath line using the Map screen for guidance. When the vehicle comes alongside the previous treatment (perimeter lap) the operator touches the **LOCK** button in the Guide Menu and then follows the Virtual Road or arrows on the light bar to stay on-line. A guideline is displayed on the Map screen which indicates the line that needs to be followed. GuideTRAX V3 will continue to automatically update the guideline as the vehicle moves around the field.

The guideline will always be computed to be adjacent to the previous treatment. Hence, if the vehicle manoeuvres around a tree the subsequent guideline will also show a deviation. The operator can choose to ignore this guideline and simply steer straight through these areas. A typical racetrack screen is shown in Figure 5-7.

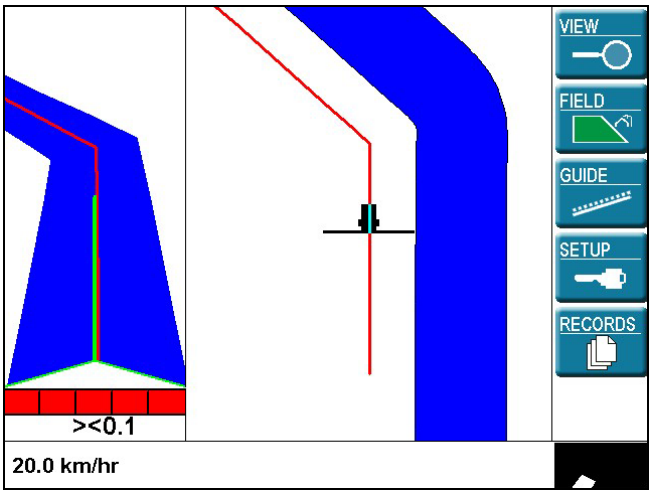


Figure 5-7: Typical guideline from racetrack guide lock

5.1.3 Contour Lines Method

A contour line is a set of parallel lines that are not straight; however the adjacent lines are parallel to each other. The contour lines method is the same in operation as the racetrack method for spraying a field. The guidance **LOCK** button is used to lock on to an adjacent line, which is the contour line to be followed.

The operator merely has to drive the first contour line in a field as usual. Typically, this will be alongside a contour bank that dictates the pattern or shape of the contour line to be followed. Similar to before, GuideTRAX V3 computes the next guideline to be adjacent to the last swath by the distance of one swath width minus any guide overlap distance, see Section 5.3.1. Once again, this is not important as GuideTRAX V3 automatically calculates this for the operator. A typical contour spray pattern is shown in Figure 5-8.

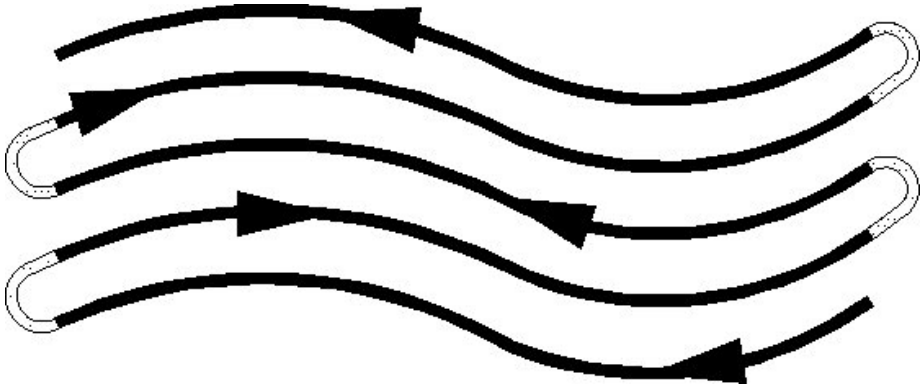


Figure 5-8: Typical Spray Pattern using Contour Lines

As the first contour swath line is completed, the vehicle turns around to commence the next swath line using the Map screen for guidance. Once the vehicle comes alongside the previous swath line (first contour line) the operator engages the guidance lock by pressing the **LOCK** button in the Guide Menu and then follows the indicators on the light bar to stay on-line. A guideline is displayed on the Map screen indicating the lock line that needs to be followed.

At the end of the contour line, guidance is switched off as the vehicle moves away from the treatment. Then as the vehicle is turned around to commence the next contour swath line the guidance lock is once again engaged by pressing the **LOCK** button. This pattern is repeated until the field treatment has been completed.

If AutoLOCK is ON (see Section 6.3.3), there is no need to keep pressing **LOCK** after each turn.

As with the racetrack guidance, the guideline will always be computed to be adjacent to the last swath line. As shown previously if the vehicle manoeuvres around a tree or some other feature the next guideline will show the same pattern.

Hints and Tips:

- *Turn guidance off before leaving the paddock to save erroneous guidance data being displayed.*

5.2 Guidance information

Guidance information is provided to the operator using the Map screen, the Virtual Road Window and optionally using the external light bar. Each device presents information to the operator that enables them to make decisions on which direction to travel.

The Map screen provides a bird's eye (Map) view of the treated area. The map view clearly shows where the vehicle is and the direction it is heading. It may be configured as the North Up display or the Heads Up display. Most operators prefer the Map Screen to be orientated in the Heads Up mode as the top of the screen represents the direction the vehicle is heading. Furthermore the treated swath shows which areas have been treated and the area yet to be treated.

Alternatively, the display can be split to show both the Map screen and the Virtual Road window. The Virtual Road displays an image directly forward of the vehicle, from a typical vehicle operator position, to show the guideline.

In addition to this directly below the Virtual Road Window is the lightbar which defines the offset to the guideline. The lightbar information is computed from the centreline of the vehicle to the guideline and the ligthbar arrows may be configured for user preference. Each arrow can be configured to represent one centimetre or one metre. This same information will also be displayed on the external lightbar (optional item).

In summarising there is no right or wrong method to adopt, it is quite simply a user preference as to which information is used for guidance.

5.2.1 Virtual Road Information

The Virtual Road is very easy to follow as the information displayed is very intuitive. The Virtual Road can be likened to driving along a roadway, however rather than driving on one side of the road, the whole road was used and the white line painted down the centre represented the guideline.

When sitting in a vehicle and looking forward along the road it appears to become smaller as it approaches the horizon. Similarly the Virtual Road becomes smaller as it approaches the top of the screen. Deviations along the road are also easily interpreted as the Virtual Road has no obstructions to block the view along the roadway.

An important aspect to consider is the width of the roadway in the Virtual Road. This does not represent the actual swath width of the treated area, but rather a fat guideline. The actual guideline in the centre of the roadway is the true position where the vehicle should be driven.

The Virtual Road has a vehicle bonnet in the lower portion of the Window with an elongated line extending from the centre of the bonnet as shown in Figure 5-9. This represents the centreline of the vehicle projected forward along the Virtual Road. The tip of the triangular bonnet represents the centre of the vehicle.

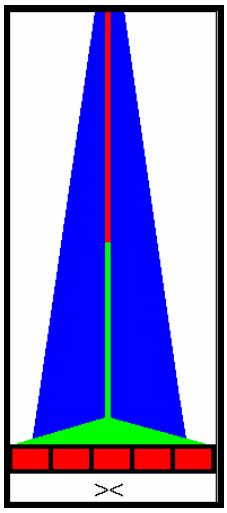


Figure 5-9: The Virtual Road

In essence the red guideline and the green centreline of the vehicle should coincide for perfect guidance.

The width and depth of the Virtual Road may be customised for individual user preferences if necessary, see Section 6.3.4 for further details.

5.2.2 Lightbar

The lightbar information is configured to display how far off-line the vehicle is from the guideline. The accuracy required for the lightbar information will be dependant upon two factors, firstly the input GPS information and secondly the required treatment.

The information that is displayed below the Virtual Road Window may also be displayed on the optional external lightbar. The external lightbar provides the driver with guidance information from a physical device that

is mounted in the driver's line of vision. Offsets are easily seen, without having to look away from the driving task at hand.

The lightbar provides a left-right indicator showing which way the operator must steer to get on to the current guideline. The operator manoeuvres the vehicle to either the left or right as indicated by the lightbar until the vehicle is on-line. A typical light bar display is shown in Figure 5-10.

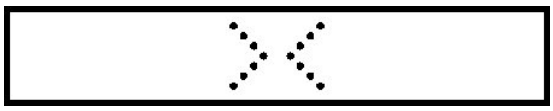


Figure 5-10: The lightbar display showing the vehicle is on-line

If the vehicle veers off-line, the lightbar will display arrows indicating the direction (left or right) needed to steer to the current guideline. The number of arrows shows how far off-track the vehicle is, determined by preset distances (See section 6.3.5 for details on how to define the lightbar offsets). If the vehicle travels further away than these distances, the display will show how many metres/feet the vehicle is away from the guideline.

Figure 5-11: The lightbar display showing the vehicle is between 2-3m to the left of the guideline. (Note: Distance depends on lightbar settings)

Figure 5-12: The lightbar display showing the vehicle is 5m off-line.

5.3 Guidelines and offsets

GuideTRAX V3 allows the user to adjust the position of the guideline to suit different requirements. Typically this will be either to suit the requirements of the accuracy of the GPS receiver and/or the ability of the operator to follow a guideline. Furthermore it may be to assist in adopting tramline farming where different width implements are used, and when an automated steering system (AutoSTEER) is used.

5.3.1 Guide Overlap

Prior to using GPS guidance most operators automatically applied a natural overlap to accommodate any inaccuracies whilst driving. This overlap may have varied according to prevailing circumstances such as whether foam markers were visible or not.

GPS guidance however does not have a natural overlap from the operator's mind but rather a mathematical offset that is either applied or not.

The Guide Overlap is simply the amount of overlap that is applied to ensure that no area is missed when applying a treatment if the vehicle is driven wide of the guideline.

This is shown in Figure 5-13.

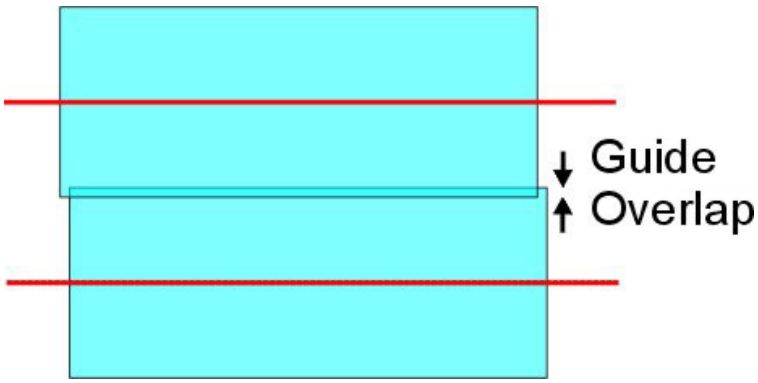


Figure 5-13 Guidance Overlap

The Guide Overlap setting can be changed in the Guide Options window from the **SETUP** **MORE** menu.

5.3.2 Guide Offset

When using tramlines in controlled traffic farming practices it will be desirable to use the same guidelines for all farming activities. However the implements will be of different widths and consequently it will be necessary to use an offset.

The Guide Options Window, as shown in Figure 5-14 allows for an implement offset (Guide Offset) to be entered. The Guide Options window can be accessed from the **SETUP** **MORE** menu.

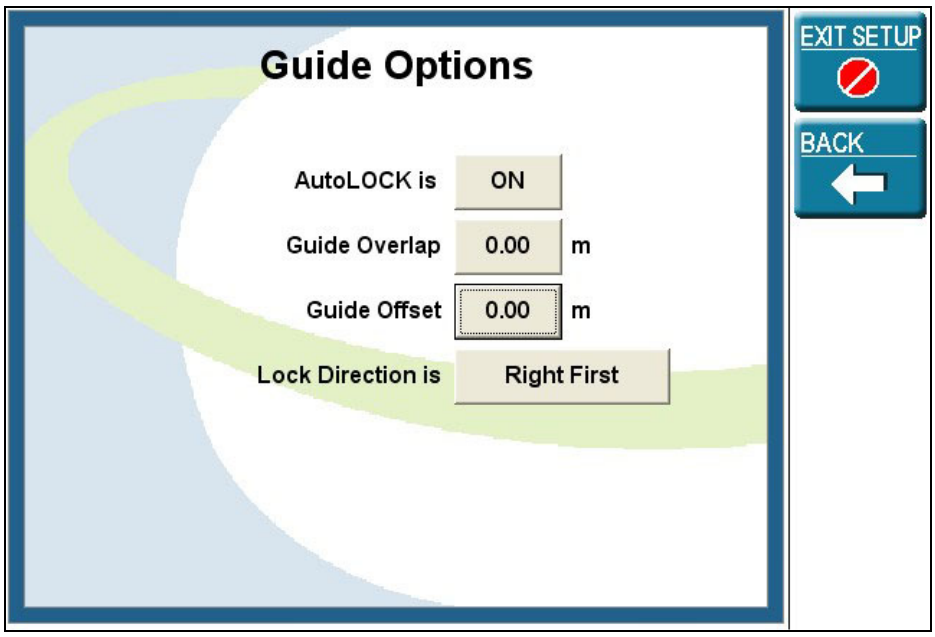


Figure 5-14 Guide Options Window

Once the offset has been entered it will be necessary to restart the field.

Note: This feature is only available when using parallel guidance.

6

Customising the System

6.1 Enabling Options By Password

E-Dif, AutoSPRAY and AutoSTEER are optional extras which may be purchased from RINEX.

These options must be enabled in GuideTRAX by password which must be requested from RINEX Technology.

Access: **SETUP** **ABOUT GUIDETRAX** **REGISTER**

Figure 6-1: Register GuideTRAX Window

1) The CFID number displayed on the screen, as shown in Figure 6-1 will need to be quoted when requesting the password from RINEX.

2) Touch the **PASSWORD** button to enter the password, and then touch **OK**.

3) Touch **BACK** **BACK** to return to the **Setup** menu.

After an option has been enabled by password, further setup procedures may be required for that option to function correctly. See Section 6.2.3 for e-Dif, Section 8 for AutoSPRAY

and Section 9 for AutoSTEER

6.2 GPS Configurations

6.2.1 Defaults

The default settings are:

GPS BAUD:	19200
GPS Type:	DIFF

6.2.2 Changing the GPS Settings

Access: **SETUP** **MORE** **GPS SETUP**

GPS Baud Rate

The GPS baud rate can be changed if required to a lower baud rate by repeatedly touching the GPS Baud button in the GPS Setup Window until it displays the correct speed, as shown in Figure 6-2.

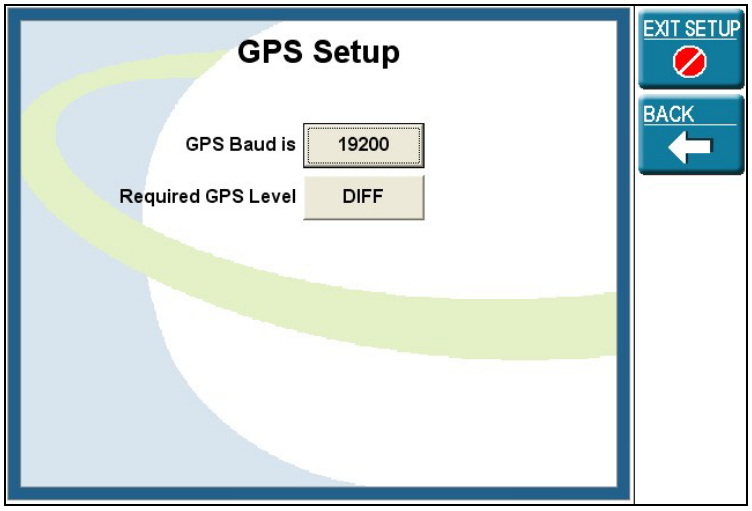


Figure 6-2: GPS Setup Window

Required GPS Level

By default, the system is configured to run on Differential GPS (DIFF). It is recommended that DIFF be used as a minimum.

A lower GPS accuracy can be selected by touching the Required GPS Level button in the GPS Setup Window as shown in Figure 6-2 above.

Select GPS if a higher accuracy signal cannot be acquired. Note that this setting is not recommended as it is not as accurate as higher accuracy signals and therefore significant errors can be introduced into the system when calculating guidance.

When GPS is selected, the scrolling GPS Status Indicator in the bottom right corner of the screen will display the No Differential signal symbol: if no DIFF signal is being received.

Touch the **EXIT SETUP** button to return to the **Main** menu or **BACK** to return to the **Setup** menu.

6.2.3 Using e-Dif (Optional Extra)

Access: **(GPS Status Icon)**

Once e-Dif has been registered by password (see Section 6.1), the e-Dif button will be displayed on the GPS Status screen as shown in Figure 6-3.

Pressing the e-Dif button turns differential mode off and swaps the MiniMAX receiver from marine beacon to e-Dif mode and calibrates it. It can take several seconds before e-Dif takes effect.

The MiniMAX will return to marine beacon mode when it is powered off/on.

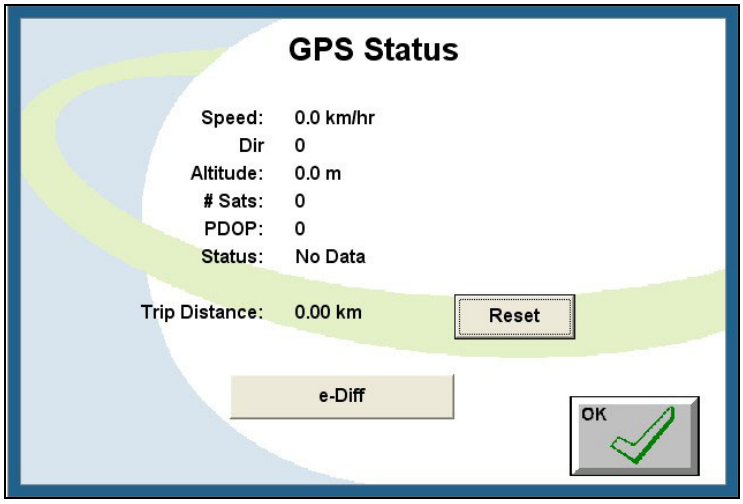


Figure 6-3: GPS Status Window With e-Dif Enabled.

6.3 Guidance Information

6.3.1 Heads Up/North Up

There are two modes of displaying information while it is being recorded (while driving). Choosing one or the other of these two views can affect the guideline being drawn on the screen.

Touch **VIEW** to select Heads Up or North Up mode.

Touch the **HEADS UP / NORTH UP** button to change to either Heads Up or North Up mode.

Heads Up – as the vehicle moves along the ground, the information on the screen is drawn so that the vehicle is always pointing towards the top of the screen, with the ground moving around the vehicle. The Heads Up button

is displayed.

North Up – as the vehicle moves along the ground, it also moves around the screen but the ground is shown as staying stationery. The North Up

button is displayed.

Hints and Tips:

- *If the Map screen is zoomed too far in or out, it may be difficult to see areas which have already been treated. Touch* **VIEW ALL** *to see the treated area, then* **IN** *to see the vehicle and* **OUT** *to see the vehicle position in relation to the treated area.*
- *If the vehicle is a long way from the treated areas in the currently selected field, either the vehicle or the treated areas may not be visible on the screen.*
- *If the treated area is visible but not the vehicle, zoom* **IN** *to see the vehicle.*
- *If the vehicle is visible on the screen but not the treated area, touch* **VIEW ALL** *to see the whole treated area, then zoom* **IN** *to see more detail of the area around the vehicle.*
- *If zoomed too far out, the vehicle will appear as a large dot on the screen. As you zoom in, the vehicle will increase in size on the screen until it resembles the selected rig.*

6.3.2 Zooming In and Out While Driving

While the vehicle is moving, GuideTRAX will not allow the system to zoom too far Out or View All in Heads Up view, but will allow the system to zoom In as close as possible.

In North Up view, it is possible to View All and zoom In or Out as far as required while driving.

6.3.3 AutoLOCK

Access: **SETUP** **MORE** **GUIDE OPTIONS**

With AutoLOCK set ON and Lock guidance activated, GuideTRAX will automatically search for adjacent treatment swaths at regular, short intervals and continue drawing a guideline.

If AutoLOCK is not selected, and GuideTRAX loses lock (i.e., stops drawing a guideline) then the Lock button in the Guide menu must be touched in order to generate the guideline again.

To turn AutoLOCK ON, touch the AutoLOCK button in the Guide Options window.

Touch **EXIT SETUP** to return to the Main menu, or **BACK** to return to the Setup menu.

6.3.4 Virtual Road

Access: **SETUP** **MORE** **VIRTUAL ROAD SETUP**

The Virtual Road can be turned on and off and customised for width and depth of view, however, the default values, as shown in Figure 6-4 are the recommended values.

Making the Virtual Road too short (depth) can result in corners coming up too quickly to be able to turn in time. Making the Back Width too narrow can create a distorted appearance which is difficult to drive to. Making the Road Width too narrow can also make it difficult to drive to.

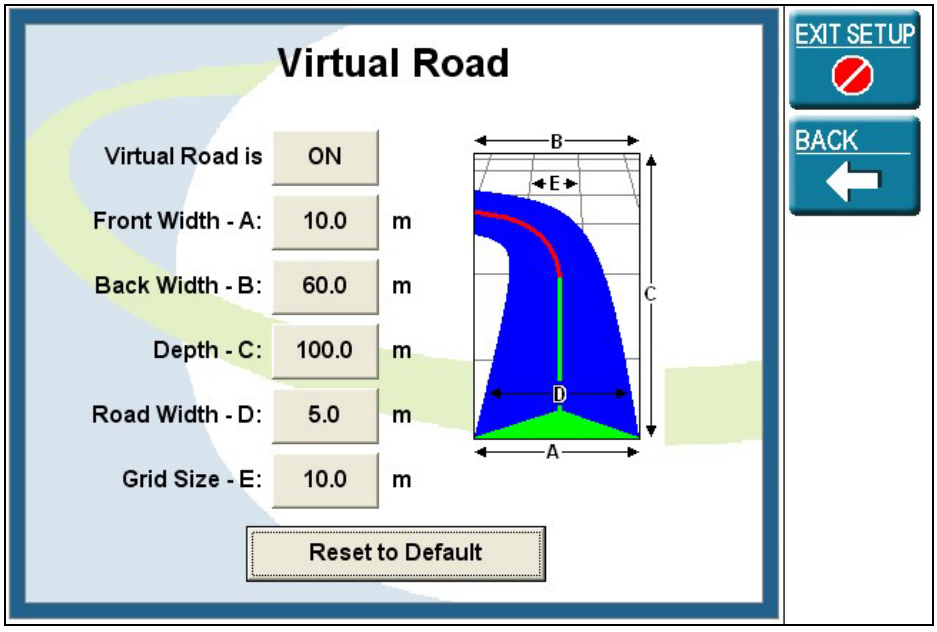


Figure 6-4: The Virtual Road Window

Touching the **RESET TO DEFAULT** button will change all settings in the Virtual Road Window back to those shown in Figure 6-4 above.

Touch **EXIT SETUP** to return to the Main menu, or **BACK** to return to the Setup menu.

6.3.5 Lightbar

Access: **SETUP** **MORE** **LIGHTBAR SETUP**

Lightbar Baud

Each lightbar communicates at a speed of either 19200 baud or 9600 baud. The default setting as shown in the Lightbar Setup Window in Figure 6-5 is 19200 baud. This setting can be changed to 9600 baud for older lightbars.

Hints and Tips:

- *If the the lightbar displays only "Ver 1.2x" then it is likely that this setting needs to be changed.*

Lightbar Distance Settings

The lightbar distance settings can be customised for higher or lower accuracy depending on the accuracy of the GPS receiver.

Each of the distance settings represents how far away (in metres) the vehicle is from the guideline. In the default settings shown in the Lightbar Setup Window in Figure 6-5, the **><** symbol set to 0.20m means that the lightbar will display **><** to indicate that the guideline is being followed to an accuracy of up to 0.20m.

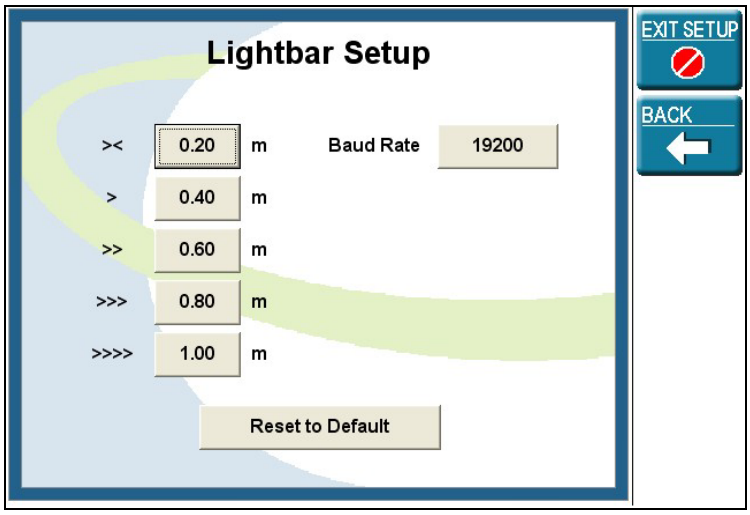


Figure 6-5: Lightbar Setup Window

It is recommended that the lightbar limits are set in relation to GPS accuracy. The default lightbar settings shown in Figure 6-5 are set for the default GPS type of DGPS (Differentially corrected GPS).

For a higher accuracy GPS receiver, it may be more appropriate to set the single arrow **>** to 0.10m, with other settings set similarly.

For e-Dif, less accuracy may be more appropriate and for GPS only (i.e. without differential correction), settings should be set to even lower accuracy.

Pressing the **RESET TO DEFAULT** button will change all settings back to those shown in Figure 6-5.

Touch **EXIT SETUP** to return to the Main menu, or **BACK** to return to the Setup menu.

6.4 The Screen

Access: **SETUP** **DISPLAY SETUP**

6.4.1 Night Mode

Night Mode was designed to assist night time driving.

When turned ON, Night Mode turns the background from white to black. Text which was black is then displayed white, and Guide Points (A & B) are displayed grey.

Night Mode can be turned ON or OFF at any time.

6.4.2 Grid

By default the grid is OFF and the Grid Spacing is set to 100 metres. The grid is a light-grey pattern on the background of the Map Screen. When turned ON, it enables the driver to quickly assess a distance or area in a particular place on the screen. For example, the area encompassed by a grid square measuring 100m x 100m = 1 Ha.

Touch the **GRID SIZE** button to change the Grid spacing figure.

6.4.3 Measurement Units

The units which are displayed on the screen throughout GuideTRAX can be set to either Metric or Imperial, and can be changed from one to the other and back again at any time.

By default, the Measure Units are set to Metric.

6.4.4 Position Units

The vehicle position can be displayed in the Status Bar in either Cartesian coordinates (E/N - Easting & Northing) or geographical (Latitude & Longitude). By default the position units are set to E/N.

6.4.5 Status Bar

The Status Bar is the left half of the area at the bottom of the Main screen. Repeatedly touching this area will cycle through each of the Status messages selected in the Status Bar Setup window. By default all Status Bar information is turned OFF.

Text shown in light grey in the Status Bar Setup Window indicates that those status messages are not available as the functions they report are not available in the HT model.

To turn a status message on so that it will appear in the Status Bar, touch the button next to the required message in the Status Bar Setup window.

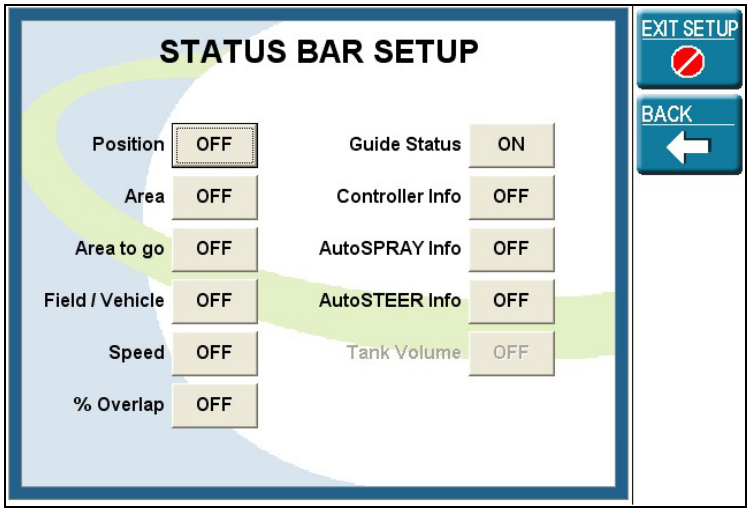


Figure 6-6: Status Bar Setup Window

For more information about the information provided in each message, see Section 2.6.

6.5 Turning Treatment Recording ON and OFF

6.5.1 The RINEX Toggle Switch

The RINEX Toggle Switch is supplied with every new system. It can be used to start and stop treatment recording – either on its own or by being connected to a controller (in which case the controller's master switch starts and stops treatment recording).

Using the RINEX Toggle Switch Alone

When used without being connected to a third party controller, the RINEX Toggle Switch is plugged into the Controller port on the front of the Saturn H interface unit. Switching the RINEX Toggle Switch on or off will turn treatment recording ON or OFF.

Connecting the RINEX Toggle Switch to a Third Party Controller

When connected to a third party controller, the RINEX Toggle Switch must be permanently left in the OFF position (if the RINEX Toggle Switch is left on, then treatment recording can't be turned off) and the third party controller's master switch must be used to turn both treatment and recording on and off together.

1) Follow the instructions in the Saturn H Guidance System Installation Manual for installation of the RINEX Toggle Switch, connecting it to the Controller port on the Saturn “H” interface unit.

2) Touch **SETUP** **VEHICLE SETUP** **RIG SETUP**.

3) In the Edit Rig window, touch **FLOW CONTROL**.

4) Touch the **FLOW CONTROLLER** button as shown in Figure 6-7.

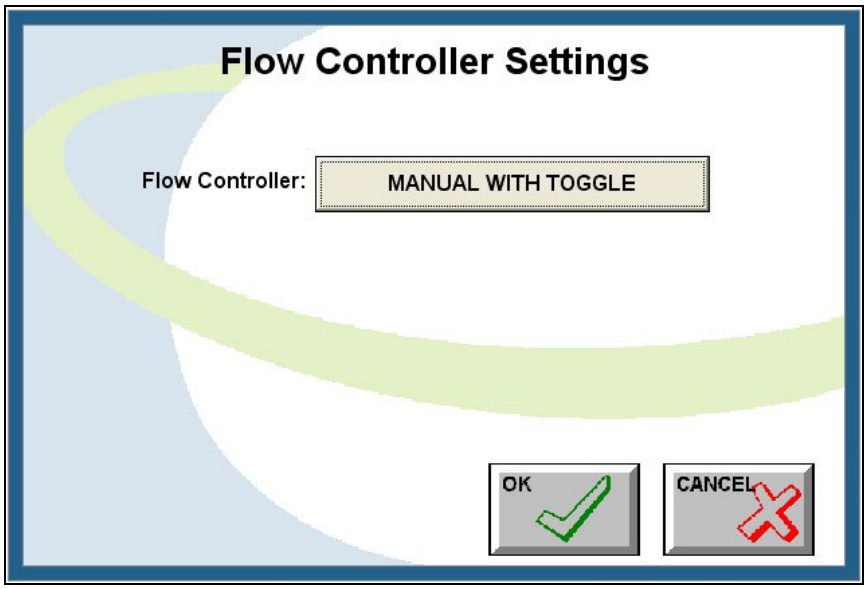


Figure 6-7: Flow Controller Settings Window

5) Select Manual WithToggle from the Flow Controller list.

6) Touch **ACCEPT** **OK** **OK**

7) Touch **SWITCH SETUP**.

8) Set Master Switch to **TOGGLE** and Section Switches to **TOUCH** as shown in Figure 6-8.

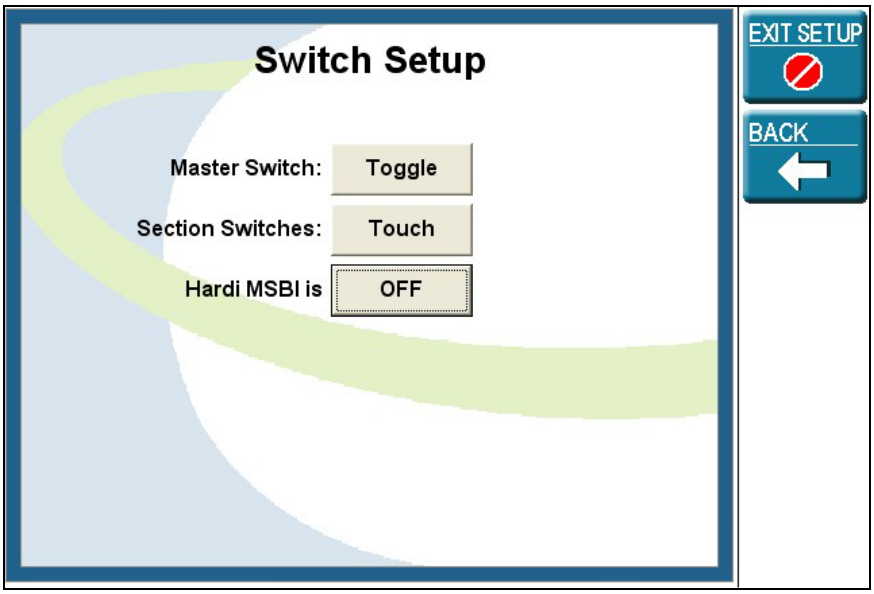


Figure 6-8: Switch Setup Window

9) Touch **EXIT SETUP** to return to the Main menu.

6.5.2 Using Touch Instead Of a Switch

Treatment recording can also be started and stopped by touching the Vehicle Position Marker on the Map screen or by touching the green bonnet triangle in the Virtual Road Window.

In this case, the Master Switch will need to be set to **TOUCH**.

6.5.3 Connecting Directly to a Third Party Controller

Treatment recording can also be started and stopped with compatible controllers that connect directly to the Saturn “H” system. It will be necessary to ensure that the correct data interface cable is used.

1) Follow the instructions in the Saturn H Guidance System Installation Manual for connecting to a Third party controller to the Controller port on the Saturn “H” interface unit.
2) Touch **SETUP** **VEHICLE SETUP** **RIG SETUP**.
3) In the Edit Rig window, touch **FLOW CONTROL**.
4) Touch the **FLOW CONTROLLER** button.
5) Select the desired Third Party Controller from the Flow Controller list.
6) Touch **ACCEPT** **OK** **OK**
7) Touch **SWITCH SETUP**.
8) Set Master Switch to **EXTERNAL** and Section Switches to **EXTERNAL**.
9) Touch **EXIT SETUP** to return to the Main menu.

6.6 The RINEX Button Box (Optional Extra)

The RINEX Button Box connects to one of the two USB ports on the Saturn “H” interface unit and has four buttons which can each be set to perform various GuideTRAX functions.

Access: **SETUP** **MORE** **REMOTE BUTTONS**

The default settings for each button are shown in Figure 6-9.

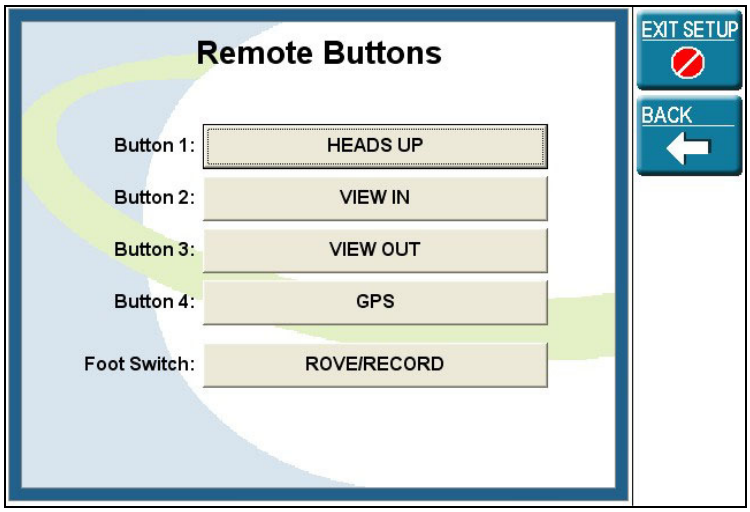


Figure 6-9 Buttons Setup Window

These settings can be changed for each button by touching on the value assigned to that button. All of the options listed in Table 6-1 are available to all buttons, and using each option has the same effect as going through the menus to select the function or turn the setting ON or OFF.

The RINEX Button Box and the RINEX Footswitch can both be connected at the same time, so that five buttons are then available.

6.7 The RINEX Foot Switch (Optional Extra)

The RINEX Foot Switch is designed to be operated by foot and is connected to one of the USB ports on the Saturn “H” interface unit.

By default, the Foot Switch is set to Rove/Record, but can be changed to perform any of the functions listed in Table 6-1.

The RINEX Button Box and the RINEX Footswitch can both be connected at the same time, so that five buttons are then available.

Table 6-1: Button Box And Foot Switch Settings

Function	Function Location	Action Performed By Button
AUTOLOCK ON/OFF	**SETUP** **MORE** **GUIDE OPTIONS**	Toggles between AutoLOCK being active and inactive. See Section 6.3.3 for more information.
AUTO-SPRAY ON/OFF	**SETUP** **AUTOSPRAY** **ON** or **OFF**	Turns AutoSPRAY ON or OFF.
AUTO-STEER ENGAGE	AutoSTEER Status button bottom right of screen (if AutoSTEER enabled and ON)	Engages AutoSTEER.
DAY/NIGHT	**SETUP** **DISPLAY** **NIGHTMODE**	Toggles between black (Night) or white (Day) background.
GPS	GPS Status icon bottom right corner of screen	Brings up the GPS Status window.
HEADS UP	**VIEW** **HEADS UP**	Toggles the view between Heads Up and North Up.
LIGHTBAR INTENSITY	**GUIDE** **MORE** **LIGHTBAR**	Brings up the Lightbar (optional) Intensity window.

Function	Function Location	Action Performed By Button
LOCK GUIDE	**GUIDE** **LOCK**	Enables Lock guidance.
PARALLEL GUIDE	**GUIDE** **PARALLEL**	Enables Parallel guidance (after AB points have been set).
POINT AB	**GUIDE** **POINT A** or **POINT B**	Sets Point A, or if Point A has already been set, sets Point B.
ROVE/ RECORD	Vehicle Icon on Map Screen OR Green bonnet in Virtual Road Window.	If Touch has been selected in Setup > Farms > Advanced > Connect > Switch, then pressing a button which has been set to Rove/Record is the same as touching the screen to turn treatment recording on and off.
VIEW ALL	**VIEW** **VIEW ALL**	Zooms display to show all of the recorded treatment data in the current field.
VIEW IN	**VIEW** **VIEW IN**	Zooms display in.
VIEW OUT	**VIEW** **VIEW OUT**	Zooms display out.
VIRTUAL ROAD	**SETUP** **MORE** **VIRTUAL ROAD SETUP**	Turns the Virtual Road window on or off.

6.8 The Multi Section Boom Interface
(Optional Extra)

An optional feature of GuideTRAX V3 is the ability to display all active boom sections on the screen using the Multi Section Boom Interface (MSBI) as the individual sections are switched ON and OFF. This enables optimal coverage of a field, minimising the overlap.

The MSBI is connected between the controller port on the Saturn "H" interface unit and the spray controller. It detects the status of each boom section (ON or OFF) and passes this information to GuideTRAX where it is recorded and mapped on the screen.

The red section indicators under the Virtual Road window reflect the information about each boom section (ON or OFF) as it is received from the MSBI.

6.8.1 Installation

Follow the instructions supplied with the Multi Section Boom Interface, and connect the interface cable between the MSBI and the controller port on the Saturn "H" interface unit.

6.8.2 Enabling the MSBI

1) Touch **SETUP** **VEHICLE SETUP** **RIG SETUP** **FLOW CONTROL**.

2) In the Flow Controller Settings window, touch the Flow Controller button.

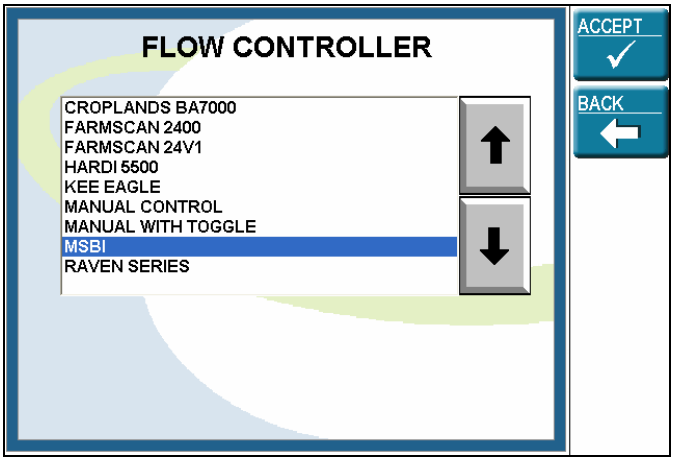


Figure 6-10 Flow Controller List Window

3) Select MSBI from the Flow Controller list as shown in Figure 6-10.

4) Touch **ACCEPT** **OK**.

5) Touch **BOOM SETTINGS**.

6) Check that the boom settings are correct and make any required changes.

7) Touch **OK** **OK** **Switch Setup**.

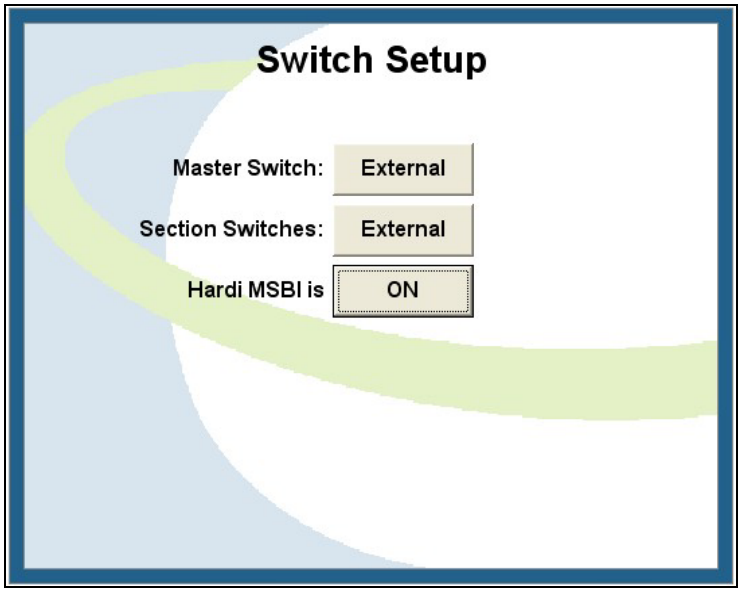


Figure 6-11 Switch Setup Window

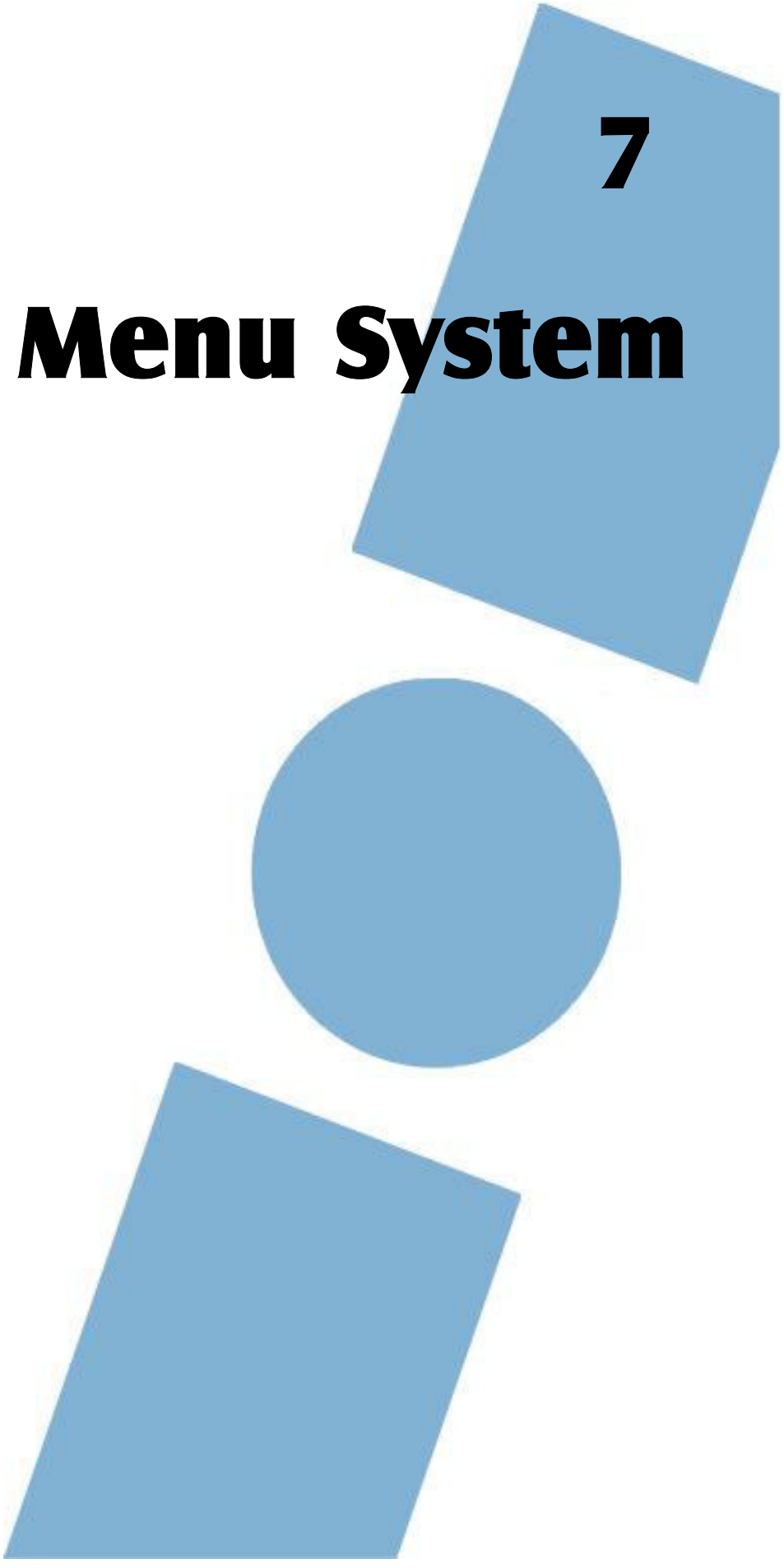
8) Select External in both Master Switch and Section Switches. If the MSBI is connected to a Hardi controller, then select Hardi MSBI is ON as shown in Figure 6-11.

9) Touch **EXIT SETUP** to return to the Main menu.

The current field must be restarted before the new settings will take effect.

7

The Menu System



GuideTRAX V3 software is operated and configured by a menu system. The menu comprises of a choice of buttons which will have an action upon GuideTRAX V3. As previously described the button is accessed by touching or tapping the appropriate part of the screen.

The V3 menu typically comprises four or five buttons aligned along the right hand side of the screen. Touching any one of these buttons will either activate the function associated with the button or lead to a sub-menu. A sub-menu is similar to the main menu whereby touching the button may either activate a function or lead to a further sub-menu.

This manual refers to the Main menu as that which is shown when the system is first started.

A useful rule of thumb is that if the menu does not show a **BACK** button or **EXIT SETUP** button then the system is at the Main menu.

This section describes the function of each button and options which can be set in each menu and sub-menu.

7.1 Menu Layout

One of the integral philosophies of the V3 menu is that regardless of the software version, the HL, HT, or HR, the menu system should be essentially the same. This is to ensure that as users requirements are expanded there is a common structure and immediate recognition of the menu layout.

Consequently some of the buttons will have no effect in particular versions of GuideTRAX V3 software. In these cases the button is typically greyed out indicating to the user that the button is not available or has no effect in that particular version of GuideTRAX V3.

The HT menu is illustrated in Figure 7-1 with the Main menu shown across the page and the sub-menus shown down the length of the page. The functions that are not available are shown as a transparent button.

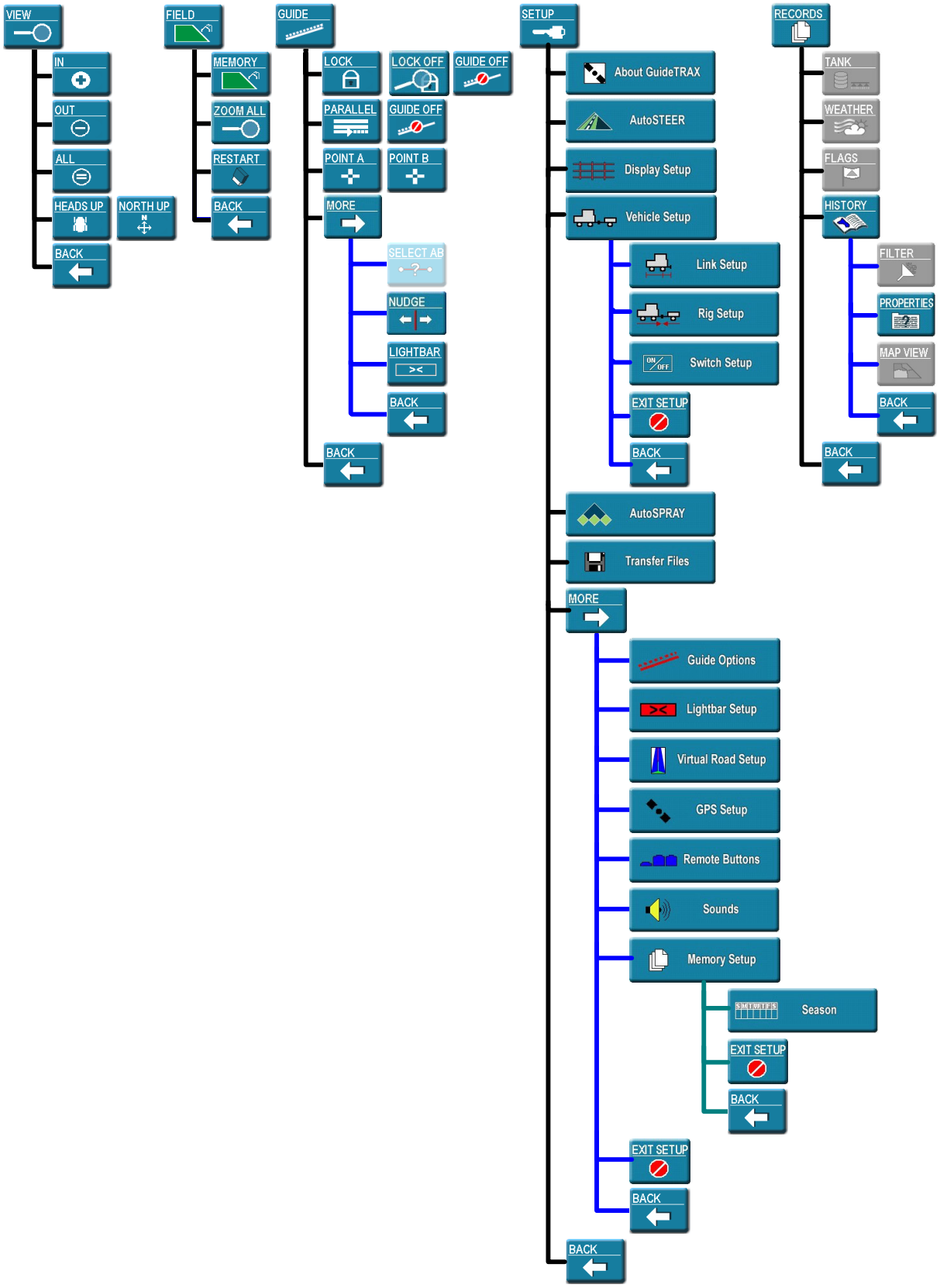


Figure 7-1: The HT Menu Layout

7.2 The Main Menu

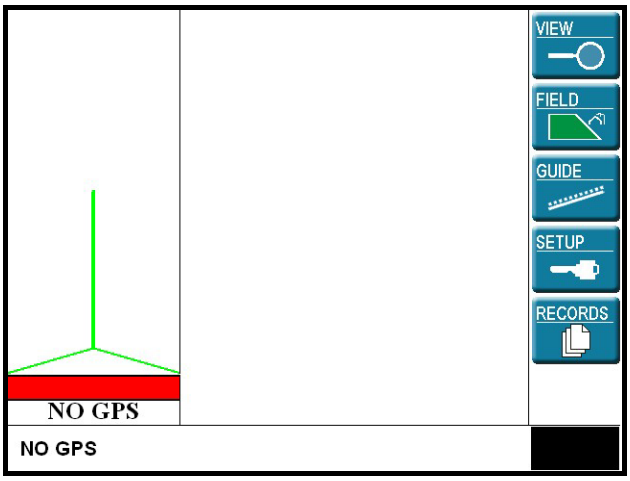


Figure 7-2: The Main Menu

Overview: The MAIN Menu, as illustrated in Figure 7-2 is always displayed when the Saturn "H" system is started. The Main menu provides access to the sub-menus for configuration and operation of the system.

Name	Button	Function
VIEW		The VIEW button accesses the View menu which allows the map screen view to be changed.
FIELD		The FIELD button accesses the Field menu to start stop, save and view field information.
GUIDE		The GUIDE button accesses the Guide menu to activate all forms of vehicle guidance.
SETUP		The SETUP button accesses the General Setup menu which allows the system to be configured for optional devices and user preference. See Section 7.3 for a description of the General Setup menu.
RECORDS		The RECORDS button accesses the Records menu to allow saving and viewing previous treatment data. See Section 7.4 for a description of the Records menu.

7.2.1 View

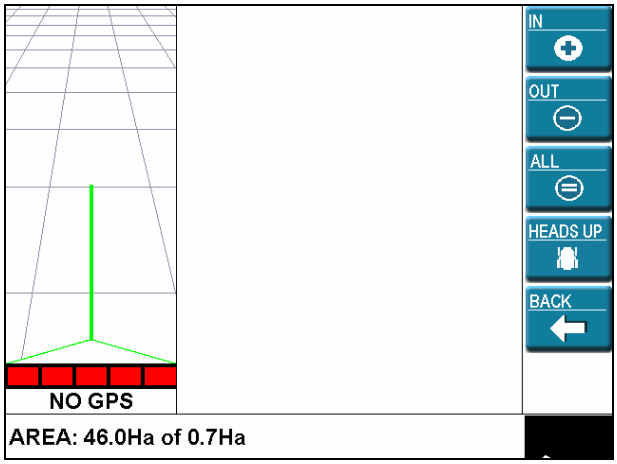


Figure 7-3: The View Menu

Overview: The VIEW Menu, as illustrated in Figure 7-3 configures the display characteristics of the Map Screen.

Name	Button	Function
IN		The IN button magnifies the image on the Map Screen based upon the central point of the screen.
OUT		The OUT button shrinks the image on the Map Screen based around the central point of the screen.
ALL		The ALL button displays all of the current field on the Map Screen. If there is no treated area in the current field, the button will have no effect.
HEADS UP / NORTH UP		This is a toggle button, it can be either HEADS UP or NORTH UP. The button toggles the Map Screen between the two modes, Heads or North Up. The Map Screen will be in the Heads Up mode when the HEADS UP button is displayed.
BACK		The BACK button returns the system to the Main Menu.

7.2.2 Field

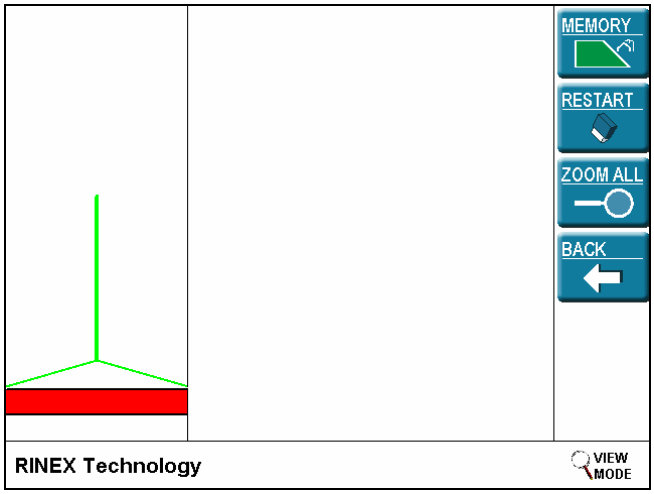


Figure 7-4: The Field Menu

Overview: The FIELD Menu, as illustrated in Figure 7-4 allows fields to be started, stopped, saved and to view information pertaining to fields.

Name	Button	Function
MEMORY		The MEMORY button selects the Virtual Memory to change the current memory slot.
RESTART		The RESTART button clears information stored in the current field.
ZOOM ALL		The ZOOM ALL button displays all of the current field on the Map Screen. In this view touching on the Map screen will zoom in on that area.
BACK		The BACK button returns the system to the Main Menu.

7.2.2.1 Field Memory

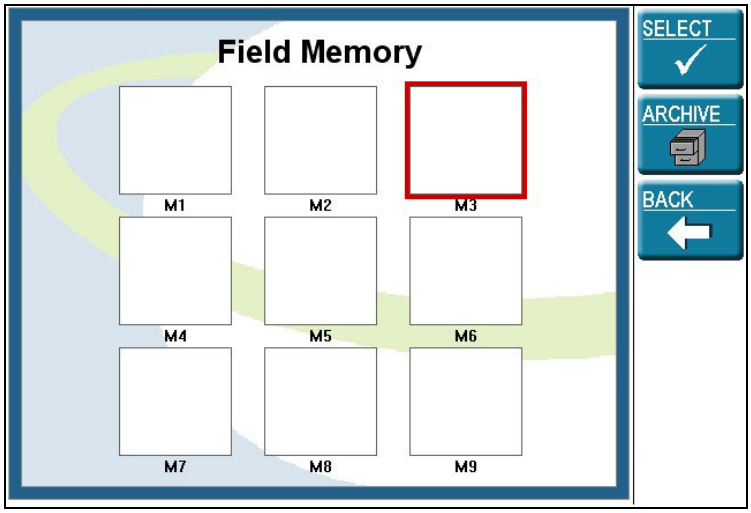


Figure 7-5: The FIELD MEMORY Window

Overview: The Field Memory Window, as shown in Figure 7-5 allows selection of a memory slot to be used as the current field. Memory slots which contain treatment data will display a miniature image of the treatment data recorded in the field.

Access: FIELD MEMORY

Name	Function
M1 to M9	The memory slots are represented as squares (not buttons) and are labelled M1 to M9 respectively. The current selected memory slot will be indicated with a red border as illustrated in Figure 7-5 When a new field is selected, the border around the current memory slot changes to grey and the new memory slot will be indicated with a red border.
SELECT Button	The SELECT button will load the selected memory slot, close the window and return to the previous Menu.
ARCHIVE Button	The ARCHIVE button will record the treatment data in the current field to the permanent memory, and then clear the memory slot.
BACK Button	The BACK button will close the Window and return to the previous Menu without changing the currently loaded memory slot.

7.2.2.2 Restart Field

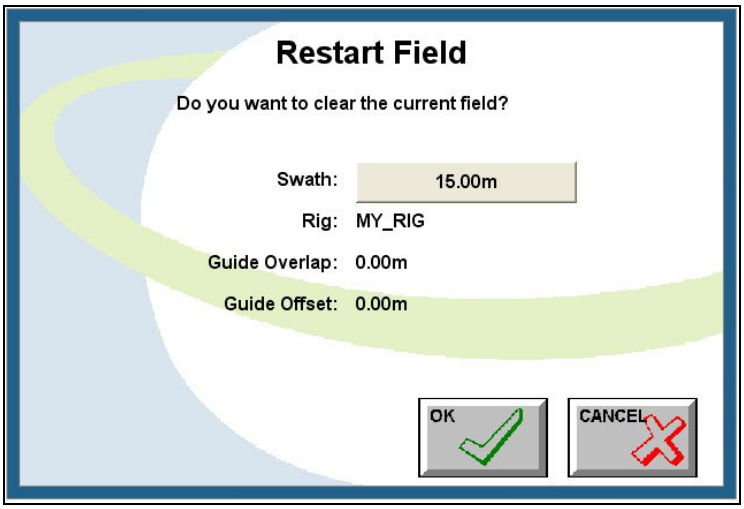


Figure 7-6: The RESTART FIELD Window

Overview: The RESTART FIELD Window, see Figure 7-6 clears data currently stored in the field. It also displays the vehicle and guidance parameters that pertain to data for the current field.

Access: **FIELD** **RESTART**

Name	Function
Swath Button	The Swath button will be displayed if the boom only has one section. Touching the Swath button allows the swath width to be changed in the Restart window. If the boom has more than one section, the swath width must be changed in **SETUP** **VEHICLE SETUP** **RIG SETUP** **BOOM SETTINGS**
OK Button	The OK button will update the selected actions, close the Window and return to the Main Menu.
CANCEL Button	The CANCEL button will ignore any selected actions, close the Window and return to the previous Menu.

7.2.3 Guide

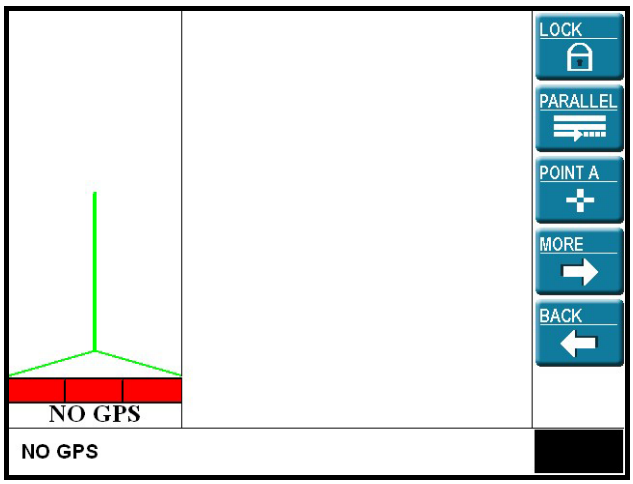


Figure 7-7: The Guide Menu

Overview: The GUIDE Menu as illustrated in Figure 7-7 allows the system to be configured and selected for vehicle guidance.

Name	Icon	Function
LOCK / LOCK OFF/ GUIDE OFF		This is a toggle button, it either invokes or cancels Lock guidance. To invoke guidance the LOCK button will be visible, once activated it will toggle the button to LOCK OFF. The button will stay in the LOCK OFF state until the system finds lock, when it will change to GUIDE OFF. If it loses lock, the button will change back to the LOCK OFF state. While the system has lock, it will remain in the GUIDE OFF state. The button will only display LOCK OFF if AutoLOCK is ON (see Section 6.3.3). To cancel Lock guidance touch the GUIDE OFF button. The button will then toggle to LOCK.

Name	Icon	Function
PARALLEL / GUIDE OFF	 	This is a toggle button, it either invokes or cancels parallel guidance. To invoke guidance the PARALLEL button will be visible, once activated it will toggle the button to GUIDE OFF. To cancel parallel guidance touch the GUIDE OFF button. The button will then toggle to PARALLEL.
POINT A/ POINT B	 	This is a toggle button, it either sets Point A or Point B for parallel guidance. To set guide Point A the POINT A button will be visible, once set the button will toggle to POINT B. Once Point B has been set the button WILL toggle to POINT A.
MORE		The MORE button selects the Guide More menu, to allow access to the Nudge guideline option and to allow adjustment of lightbar intensity.
BACK		The BACK button returns the system to the Main Menu.

7.2.3.1 Guide More Menu

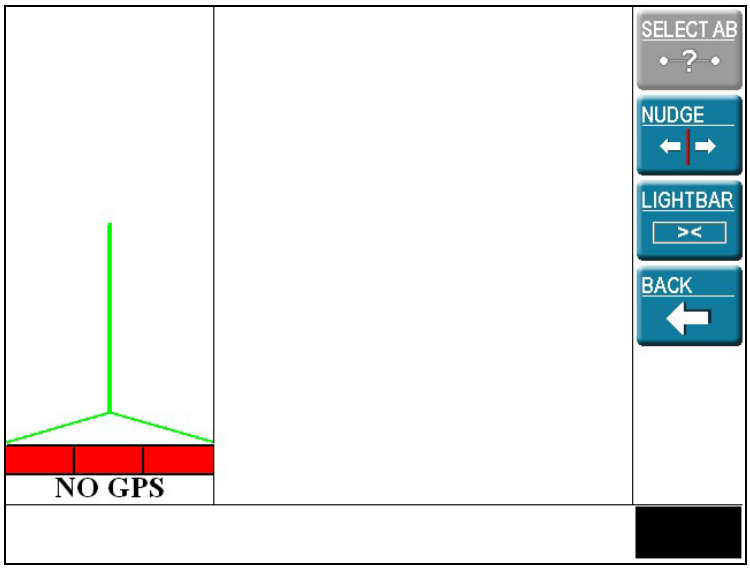


Figure 7-8: Guide More Menu

Overview: The GUIDE MORE Sub Menu, see Figure 7-8 is for selecting and configuring Guide options.

Access: **GUIDE** **MORE**

Name	Button	Function
SELECT AB		The SELECT AB button is not operational in the HT model. AB points can be selected in the **RECORDS** **HISTORY** **PROPERTIES** **EDIT** Window – see Section 7.4.1.1.
NUDGE		The NUDGE button allows the GPS guideline to be temporarily adjusted.
LIGHTBAR		The LIGHTBAR button will display the Lightbar Intensity window.
BACK		The BACK button returns the system to the Guide menu.

7.2.3.2 Nudge

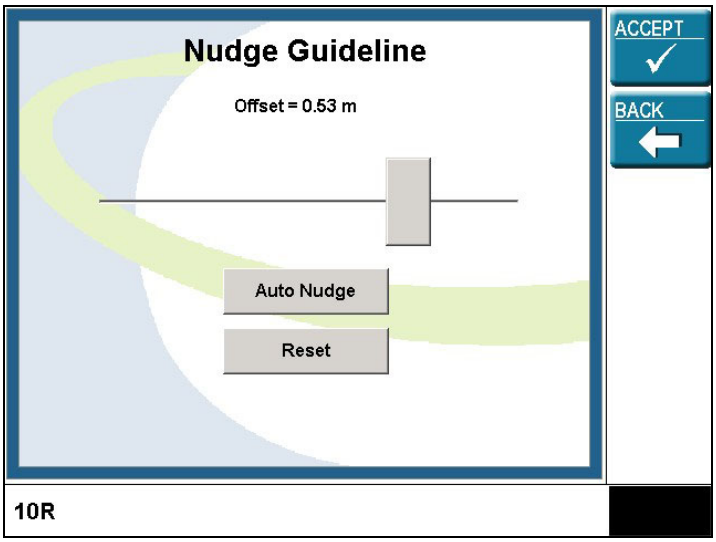


Figure 7-9: The Nudge Guideline Window

Overview: The Nudge Guideline Window, see Figure 7-9 allows the GPS guideline to be temporarily adjusted for GPS drift.

Access: GUIDE MORE NUDGE

Name	Function
SLIDER BAR	Dragging the slider bar to the left or right will increase or decrease the Offset value as the bar is moved left or right. The ACCEPT button must be pressed for the new offset value to take effect.
AUTO NUDGE BUTTON	The AUTO NUDGE button will shift the guideline to the present location of the vehicle. It is assumed that the vehicle is positioned exactly on the centre of the physical line. The Offset value will change to reflect the distance that the guideline has been "nudged" from the previous guideline. The ACCEPT button must be pressed for the new offset value to take effect.
RESET BUTTON	The RESET button will set the Offset value back to 0.
ACCEPT BUTTON	The ACCEPT button will update the selected actions, close the Window and return to the previous Menu.
BACK BUTTON	The BACK button will ignore any selected actions, close the Window and return to the previous Menu.

7.2.3.3 Lightbar Intensity

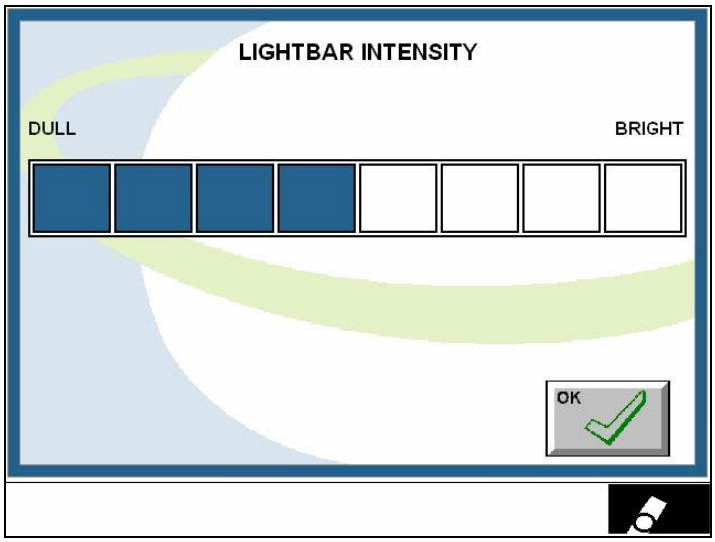


Figure 7-10: The Lightbar Intensity window

Overview: The LIGHTBAR INTENSITY Window, see Figure 7-10 controls the brightness of the optional lightbar.

Access: GUIDE MORE LIGHTBAR

Name	Function
DULL/ BRIGHT Buttons	The squares between DULL and BRIGHT are buttons which control the brightness (intensity) of the optional lightbar.
OK Button	The OK button will update the selected actions, close the Window and return to the previous Menu.

7.3 General Setup

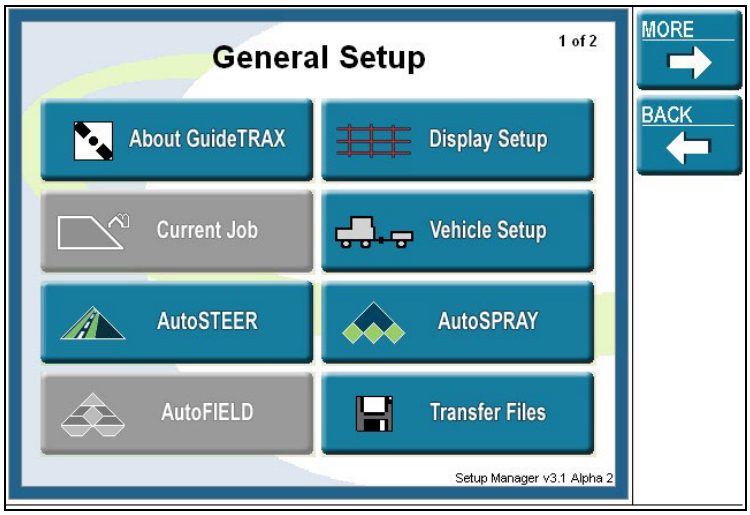


Figure 7-11: The General Setup Menu Page 1

Overview: The GENERAL SETUP Menu Page 1, as illustrated in Figure 7-11 allows the system to be configured for optional devices and user preferences.

Access: SETUP

Name	Button	Function
ABOUT GUIDETRAX	About GuideTRAX	The ABOUT GUIDETRAX button selects the About GuideTRAX window to allow registration of e-Dif and upgrade to other GuideTRAX models. Also provides useful system information including software version.
CURRENT JOB	Current Job	The CURRENT JOB button is not operational in the HT model.
AutoSTEER	AutoSTEER	The AutoSTEER button selects the AutoSTEER window to allow AutoSTEER to be turned ON or OFF.

Name	Button	Function
AutoFIELD		The AutoFIELD button is not operational in the HT model.
DISPLAY SETUP		The DISPLAY SETUP button selects the Display Setup window to allow configuration of the display screen and Status Bar.
VEHICLE SETUP		The VEHICLE SETUP button selects the Vehicle Setup sub-menu to allow configuration of Links, Rigs and Switches.
AutoSPRAY		The AutoSPRAY button selects the AutoSPRAY window to allow configuration of AutoSPRAY.
TRANSFER FILES		The TRANSFER FILES button selects the Transfer Files Window to allow treatment data files to be exported.
MORE		The MORE button selects Page 2 of the General Setup Menu
BACK		The BACK button returns the system to the main menu.

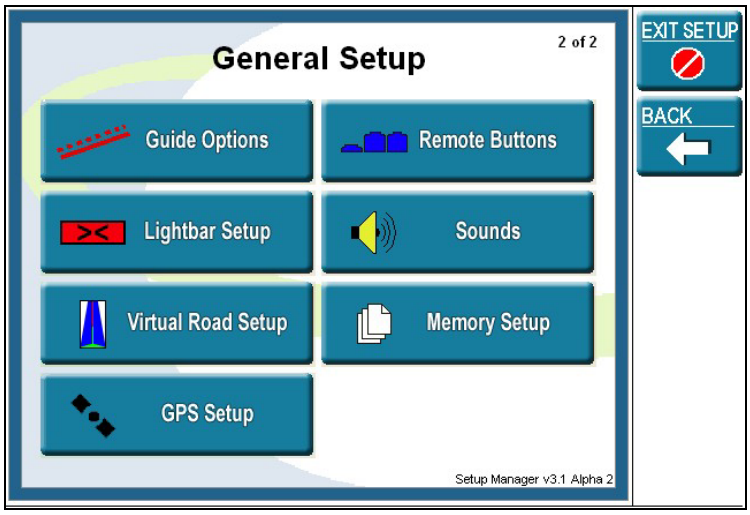
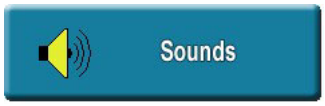


Figure 7-12: The General Setup Menu Page 2

Overview: The GENERAL SETUP Menu Page 2, as illustrated in Figure 7-12 allows the system to be configured for optional devices and user preferences.

Access: **SETUP** **MORE**

Name	Button	Function
GUIDE OPTIONS	Guide Options	The GUIDE OPTIONS button selects the Guide Options window to allow configuration of guidance settings such as AutoLOCK, guide overlap, offset and lock search direction.
LIGHTBAR SETUP	Lightbar Setup	The LIGHTBAR SETUP button selects the Lightbar Setup window to allow configuration of lightbar limits and communication speed.
VIRTUAL ROAD SETUP	Virtual Road Setup	The VIRTUAL ROAD SETUP button selects the Virtual Road Setup window to allow configuration of Virtual Road dimensions.

Name	Button	Function
GPS SETUP		The GPS SETUP button selects the GPS Setup window to allow configuration of communication speed and level of accuracy.
REMOTE BUTTONS		The REMOTE BUTTONS button will display the Remote Buttons window for the external button box (optional).
SOUNDS		The SOUNDS button selects the Sound Setup window to turn sound on/off and enable volume adjustment if speakers or headphones are connected to the Saturn H interface unit.
MEMORY SETUP		The MEMORY SETUP button selects the Memory Setup menu to allow selection of the current season.
EXIT SETUP		The EXIT SETUP button returns the system to the Main menu.
BACK		The BACK button returns the system to Page 1 of the General Setup menu.

7.3.1 About GuideTRAX

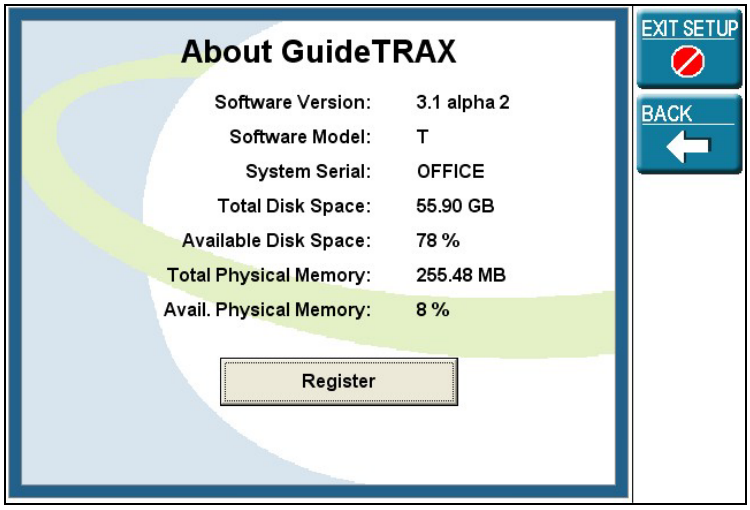


Figure 7-13: About GuideTRAX Window

Overview: The About GuideTRAX Window, see Figure 7-13 displays the version of software and pertinent information on the Saturn "H" system and allows the registration of e-Dif, addition of optional extras (AutoSPRAY and/or AutoSTEER) and upgrade to the HR model.

Access: **SETUP** **ABOUT GuideTRAX**

Name	Function
REGISTER Button	The REGISTER button opens the Register GuideTRAX window.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.1.1 Register

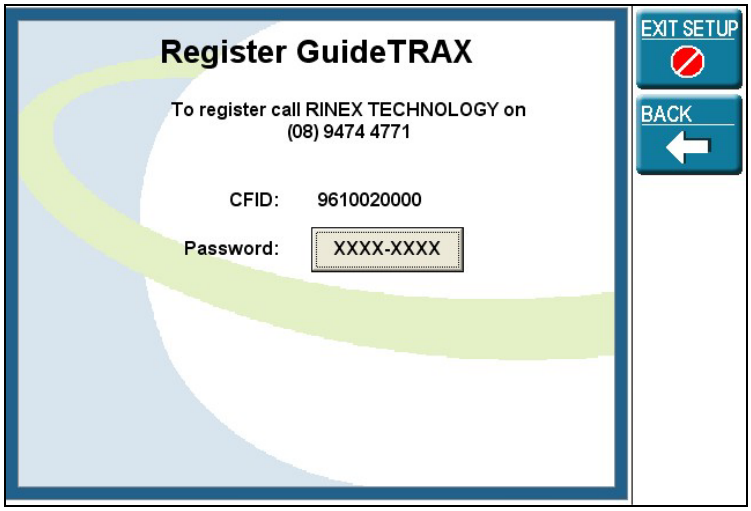


Figure 7-14: Register GuideTRAX Window

Overview: The Register GuideTRAX Window, see Figure 7-14 allows entry of a Password (registration code).

Access: **SETUP** **ABOUT GUIDETRAX** **REGISTER**

Name	Function
PASSWORD Button	The PASSWORD button selects the keyboard to allow the password (registration code) to be entered. The password must be obtained from RINEX.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.2 AutoSTEER

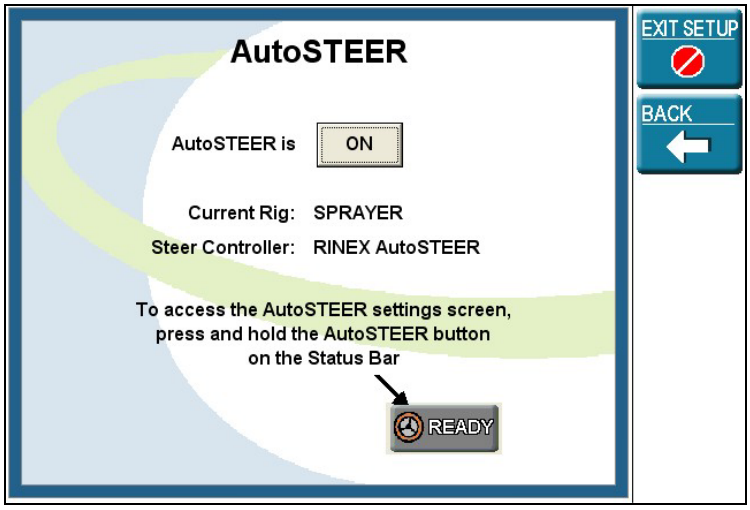


Figure 7-15: AutoSTEER Window

Overview: The AutoSTEER Window, see Figure 7-15 displays the currently selected vehicle and steering controller and allows AutoSTEER to be turned ON or OFF.

Access: **SETUP** **AUTOSTEER**

Name	Function
AutoSTEER Button	The AutoSTEER button turns AutoSTEER ON or OFF.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.3 Display Setup

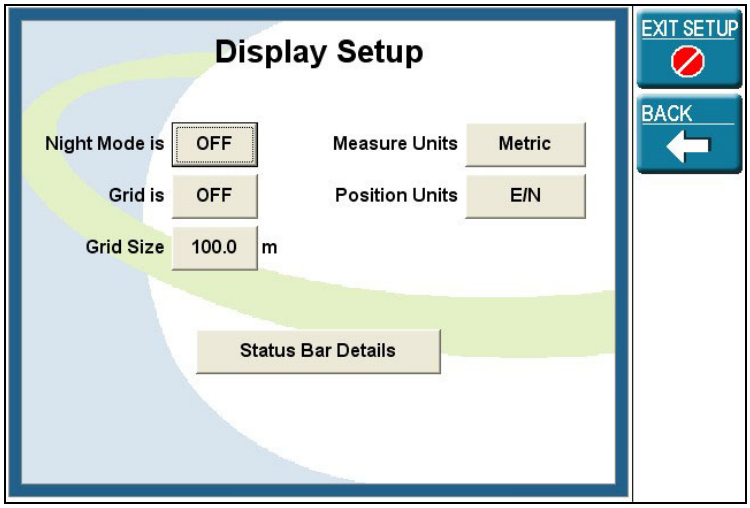


Figure 7-16: Display Setup Window

Overview: The Display Setup Window, see Figure 7-16 allows the display screen to be configured and Status Bar messages to be selected.

Access: **SETUP** **DISPLAY SETUP**

Name	Function
NIGHT MODE Button	The NIGHT MODE button turns Nightmode ON or OFF. When ON, Night Mode turns the background from white to black. Text is then displayed in white, and Guide Points (A & B) are displayed in grey.
GRID Button	The GRID button turns the grid ON or OFF on the Map screen.
GRID SIZE Button	The GRID SIZE button selects a keyboard to enter a value for the grid spacing.
MEASURE UNITS Button	The MEASURE UNITS button allows units of measurement which are displayed on the screen to be set to either Metric or Imperial.

POSITION UNITS Button	THE POSITION UNITS button sets how the position units will be displayed in the Status Bar. Units can be in either Cartesian coordinates (E/N - Easting & Northing) or geographical (Latitude & Longitude).
STATUS BAR DETAILS Button	The STATUS BAR button selects the Status Bar Window for selection of information to be displayed.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.3.1 Status Bar Setup

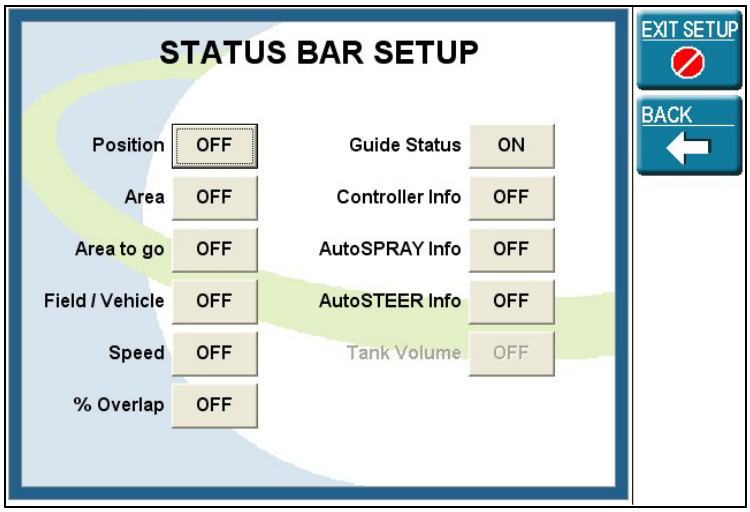


Figure 7-17 : The Status Bar Setup Window

Overview: The Display Setup Window, see Figure 7-17 allows the Status Bar messages to be selected.

Access: **SETUP** **DISPLAY SETUP** **STATUS BAR DETAILS**

Each of the Status Bar Setup buttons can be toggled ON or OFF to turn the display of the corresponding Status Bar message on or off. See Section 2.6 for more information relating to Status Bar messages.

Name	Function
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.4 Vehicle Setup

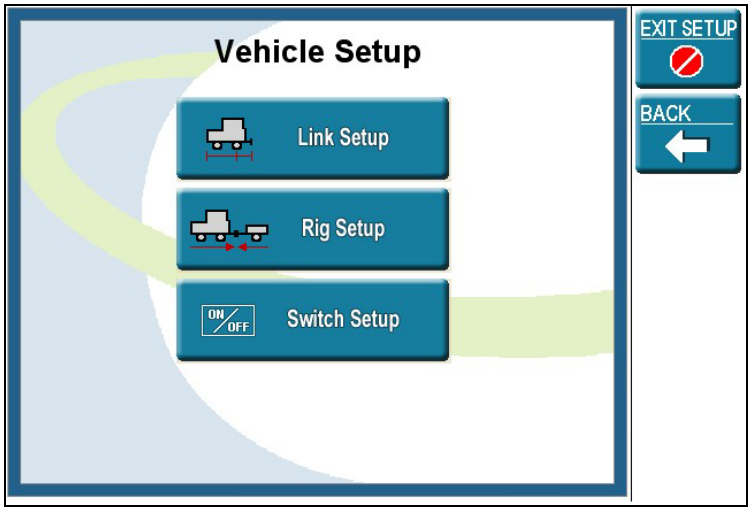


Figure 7-18: The Vehicle Setup Menu

Overview: The Vehicle Setup Menu, see Figure 7-18 is for entering information on plant and equipment on the farm.

Access: **SETUP** **VEHICLE SETUP**

Name	Button	Function
LINK SETUP		The LINK SETUP button will select the Link Setup Window for selection and editing of links.
RIG SETUP		The RIG SETUP button will select the Edit Rig Window to allow the rig to be edited.
SWITCH SETUP		The SWITCH SETUP button will select the Switch Setup Window to allow switch selection.
EXIT SETUP		The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK		The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.4.1 Link Setup

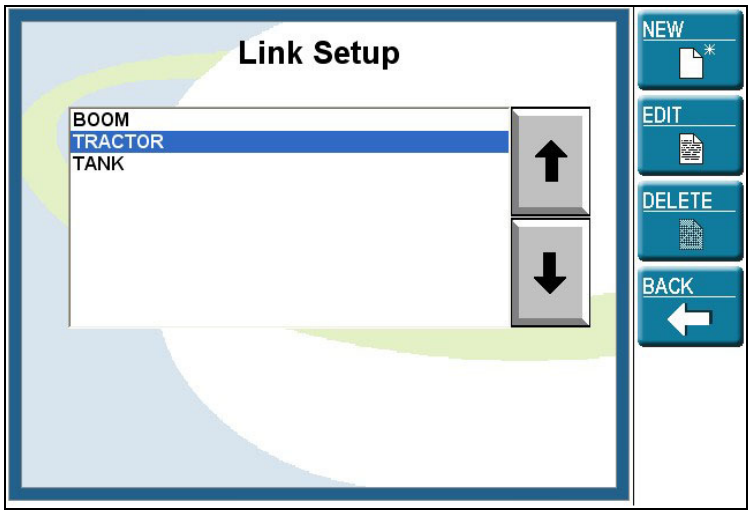


Figure 7-19: Link Setup Window

Overview: The Link Setup Window as shown in Figure 7-19 allows the Vehicle and Implement Link details to be entered and edited as required.

Access: **SETUP** **VEHICLE SETUP** **LINK SETUP**

Name	Function
↑ (UP) Button	The UP button moves the selection bar up the list of available links.
↓ (DOWN) Button	The DOWN button moves the selection bar down the list of available links
NEW Button	The NEW button will select the Link Wizard to allow entry of a new link.
EDIT Button	The EDIT button will select the Link Wizard so the selected link maybe edited
DELETE Button	The DELETE button will select the warning message Window so that the selected link maybe deleted.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

- **Link Setup Wizard Step 1**

Figure 7-20: The Link Setup Wizard Step 1

Overview: The Link Setup Wizard Step 1 as shown in Figure 7-20 allows Link name to be entered and edited as required. See Section 3 for more information about setting up links.

Access: **SETUP** **VEHICLE SETUP** **LINK SETUP** **NEW** **or** **EDIT**

Name	Function
BACK Button	The BACK button is not available in the Link Wizard Step 1.
CANCEL Button	The CANCEL button will ignore any changes or selected actions, close the Wizard and return to the Link Setup window.
NEXT Button	The NEXT button will select Step 2 of the Link Wizard.

- **Link Setup Wizard Step 2**

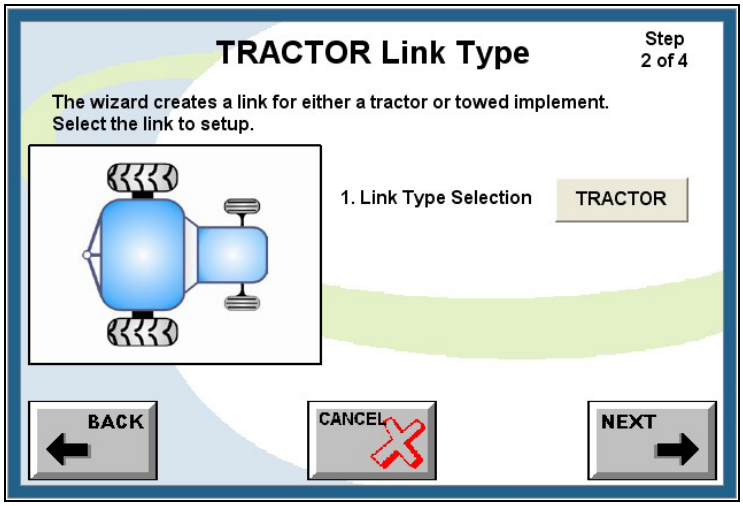


Figure 7-21: The Link Setup Wizard Step 2

Overview: The Link Setup Wizard Step 2 as shown in Figure 7-21 allows Link type to be selected. See Section 3 for more information about setting up links.

Access: **SETUP** **VEHICLE SETUP** **LINK SETUP** **NEW** or **EDIT** **NEXT**

Name	Function
LINK TYPE SELECTION Button	The LINK TYPE SELECTION button allows selection of either TRACTOR or IMPLEMENT link type.
BACK Button	The BACK button will update the selected actions, close the Window and return to Link Wizard Step 1.
CANCEL Button	The CANCEL button will ignore any changes or selected actions, close the Wizard and return to the Link Setup Window.
NEXT Button	The NEXT button will select Step 3 of the Link Wizard.

- **Link Setup Wizard Step 3**

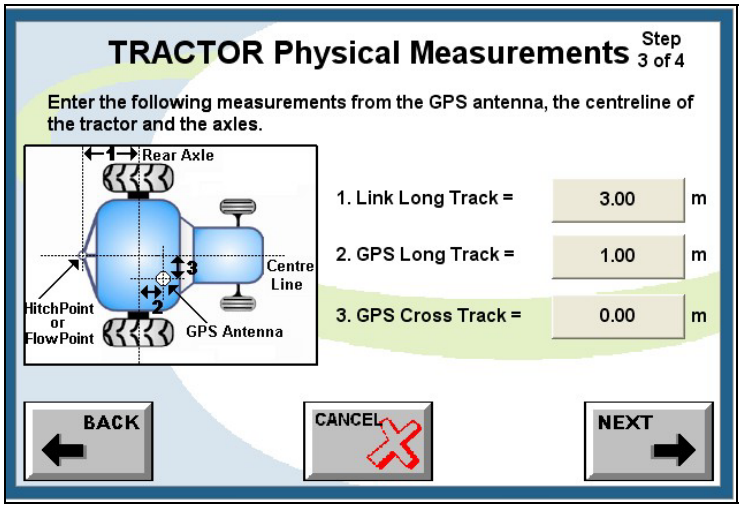


Figure 7-22: The Link Setup Wizard Step 3

Overview: The Link Setup Wizard Step 3 as shown in Figure 7-22 allows Link measurements to be entered. See Section 3 for more information about setting up links.

Access: **SETUP | VEHICLE SETUP | LINK SETUP | NEW or EDIT | NEXT | NEXT**

Name	Function
LINK LONG TRACK Button	The LINK LONG TRACK button opens the numerical keyboard to enter the value of the Link Long Track.
GPS LONG TRACK Button	The GPS LONG TRACK button opens the numerical keyboard to enter the value of the GPS Long Track.
GPS CROSS TRACK Button	The GPS CROSS TRACK button opens the numerical keyboard to enter the value of the GPS Cross Track.
BACK Button	The BACK button will update the selected actions, close the Window and return to Link Wizard Step 2.
CANCEL Button	The CANCEL button will ignore any changes or selected actions, close the Wizard and return to the Link Setup Window.
NEXT Button	The NEXT button will select Step 4 of the Link Wizard.

- **Link Setup Wizard Step 4**

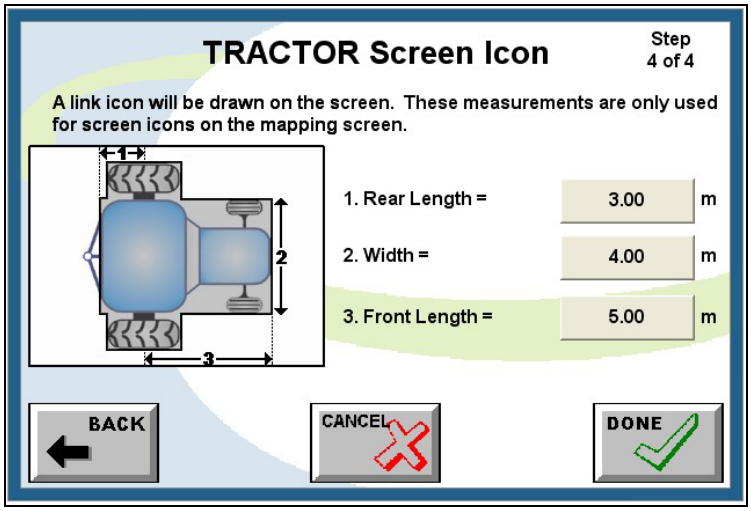


Figure 7-23: The Link Setup Wizard Step 4

Overview: The Link Setup Wizard Step 4 as shown in Figure 7-23 allows measurements to be entered for how the link is displayed on the screen. These measurements do not affect treatment recording or any other operation. See Section 3 for more information about setting up links.

Access: **SETUP** **VEHICLE SETUP** **LINK SETUP** **NEW** or **EDIT** **NEXT** **NEXT** **NEXT**

Name	Function
REAR LENGTH Button	The REAR LENGTH button opens the numerical keyboard to enter the value of the Rear Length.
WIDTH Button	The WIDTH button opens the numerical keyboard to enter the value of the Width.
FRONT LENGTH Button	The FRONT LENGTH button opens the numerical keyboard to enter the value of the Front Length.
BACK Button	The BACK button will update the selected actions, close the Window and return to Link Wizard Step 3.

CANCEL Button	The CANCEL button will ignore any changes or selected actions, close the Wizard and return to the Link Setup Window.
DONE Button	The DONE button will update the selected actions, close the Window and return to the Link Setup Window.

7.3.4.2 Rig Setup

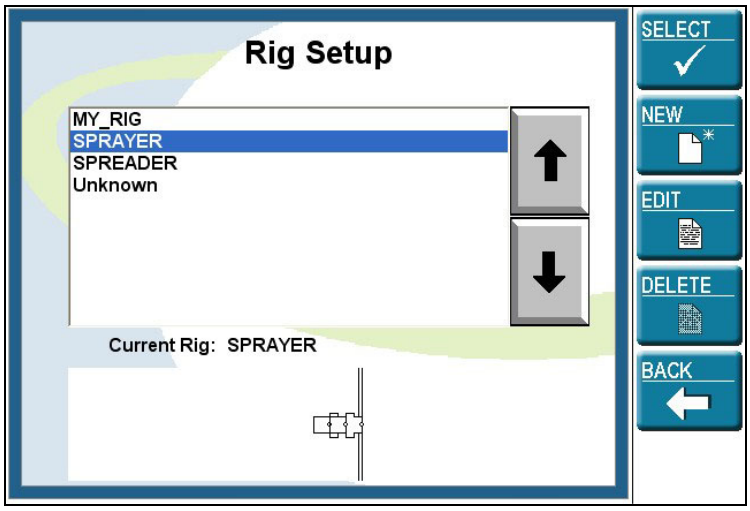


Figure 7-24: The Rig Setup Window

Overview: The Link Setup Window as shown in Figure 7-24 allows the Vehicle details to be entered and edited as required.

Access: **SETUP** **VEHICLE SETUP** **RIG SETUP**

Name	Function
↑ (UP) Button	The UP button moves the selection bar up the list of available rigs.
↓ (DOWN) Button	The DOWN button moves the selection bar down the list of available rigs
NEW Button	The NEW button will select the New Rig window to allow entry of a new rig.
EDIT Button	The EDIT button will select the Edit Rig window so the selected rig maybe edited
DELETE Button	The DELETE button will display a warning message seeking confirmation before allowing the selected rig to be deleted.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

- **New or Edit Rig**

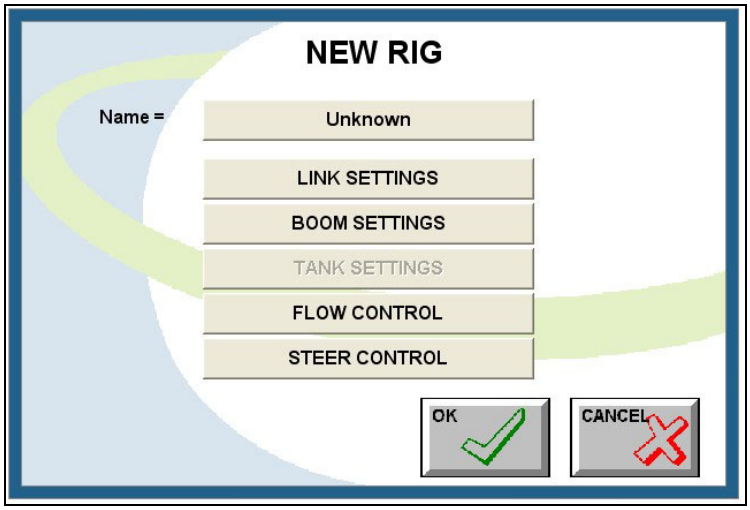


Figure 7-25: The New Rig Window

Overview: The New or Edit Rig Window as shown in Figure 7-25 allows the individual parameters of the rig to be configured

Access: **SETUP** **VEHICLE SETUP** **RIG SETUP** **NEW** **or** **EDIT**

Name	Function
NAME Button	The NAME button selects the alphanumeric keyboard to enter the name of the rig.
LINK SETTINGS Button	The LINK SETTINGS button selects the Link Settings window to allow the rig to be assembled from selected links. See Section 3 for more details about rigs and links.
BOOM SETTINGS Button	The BOOM SETTINGS button selects the Boom Settings Window to enter the number of sections and their respective widths that make up the boom associated with the rig.
FLOW CONTROL Button	The FLOW CONTROL button selects the Flow Control Settings button to select the flow controller that is used on the rig.

Name	Function
STEER CONTROL Button	The STEER CONTROL button selects the Steer Control Settings window to enable selection of the AutoSTEER steering controller.
OK Button	The OK button will update the selected actions, close the Window and return to the Rig Setup list window.
CANCEL Button	The CANCEL button will ignore any selected actions, close the Window and return to the Rig Setup list window.

- **Link Settings**

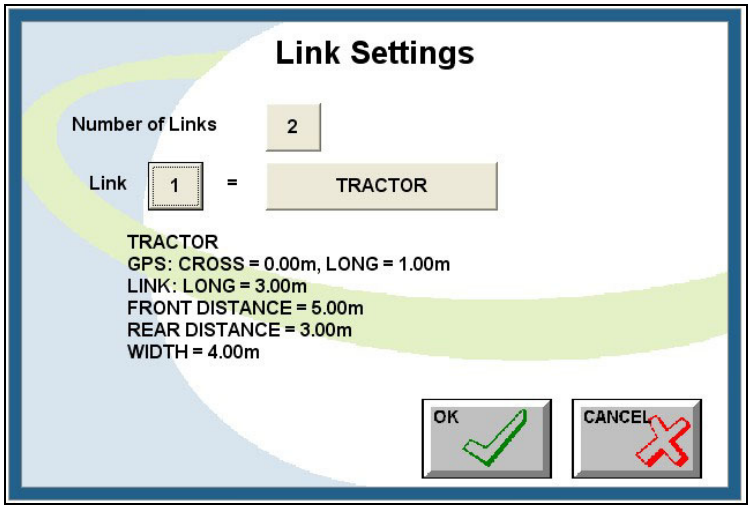


Figure 7-26: The Link Settings Window

Overview: The Link Settings window, shown in Figure 7-26 allows the number of links to be changed and each link in the rig to be selected.

Access: **SETUP** **VEHICLE SETUP** **RIG SETUP** **NEW** or **EDIT** **LINK SETTINGS**

Name	Function
NUMBER OF LINKS Button	The NUMBER OF LINKS button displays the Number of Links window where the number of links is changed.
LINK (number) Button	The LINK (number) button toggles between each link, displaying the name of the selected link on the adjacent button.
LINK (name) Button	The LINK (name) button displays the Link list window. The appropriate vehicle or implement for the selected link position can be selected from the list.
OK Button	The OK button will update the selected actions, close the window and return to the Edit Rig window.
CANCEL Button	The CANCEL button will ignore any selected actions, close the window and return to the Edit Rig window.

- **Boom Settings**

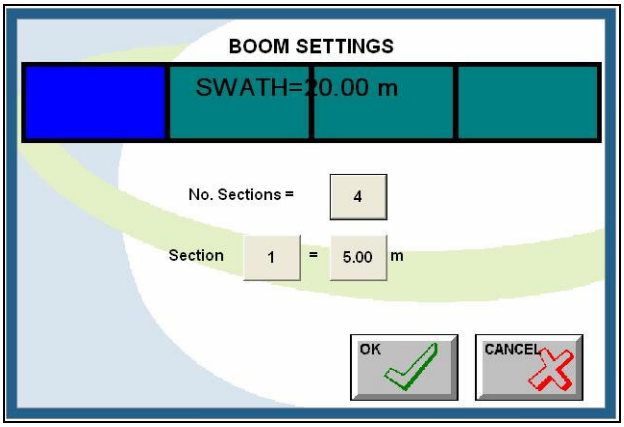


Figure 7-27: The Boom Settings window

Overview: The Boom Settings window, shown in Figure 7-27 allows the number of boom sections and the width of each boom section to be changed.

Access: **SETUP** **VEHICLE SETUP** **RIG SETUP** **NEW** or **EDIT** **BOOM SETTINGS**

Name	Function
NO. SECTIONS Button	The NO. SECTIONS button displays the Number of Boom Sections window from which the number of boom sections is changed.
SECTION Button	The SECTION button toggle between each boom section, displaying the width of the section on the adjacent button
SECTION WIDTH Button	The WIDTH button displays the numeric keyboard window. The width of the currently selected section can be changed.
OK Button	The OK button will update the selected actions, close the window and return to the Edit Rig window.
CANCEL Button	The CANCEL button will ignore any selected actions, close the window and return to the Edit Rig window.

- **Number of Boom Sections**

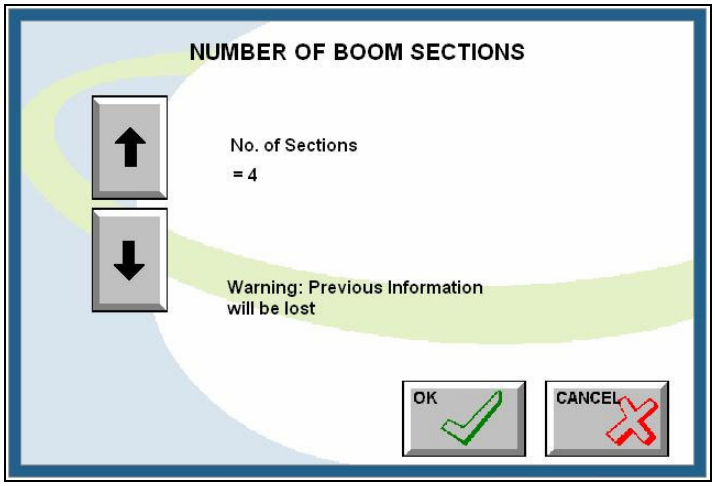


Figure 7-28: The Number of Boom Sections Window

Overview: The Number Of Boom Sections window as shown in Figure 7-28 allows the number of sections in the boom to be configured.

Access: **SETUP** **VEHICLE SETUP** **RIG SETUP** **NEW** **or** **EDIT** **BOOM SETTINGS** **NO.OF SECTIONS**

Name	Function
↑ (UP) Button	The Up button increases the number of boom sections by one until a maximum of 32 sections is reached.
↓ (DOWN) Button	The Down button decreases the number of boom sections by one until a minimum of one section is reached.
OK Button	The OK button will update the selected actions, close the window and return to the Edit Rig window.
CANCEL Button	The CANCEL button will ignore any selected actions, close the window and return to the Edit Rig window.

- **Flow Controller Settings**

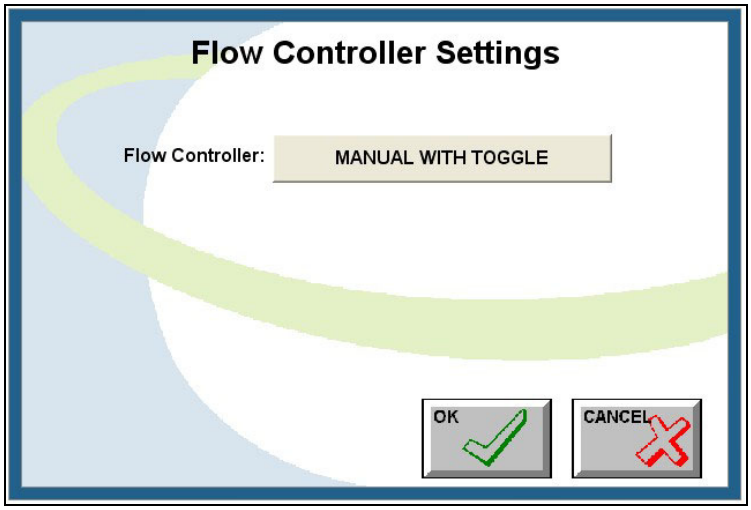


Figure 7-29: The Flow Controller Settings window

Overview: The Flow Controller Settings window, shown in Figure 7-29 allows the type of flow controller to be selected.

Access: **SETUP** **VEHICLE SETUP** **RIG SETUP** **NEW** or **EDIT** **FLOW CONTROLLER**

Name	Function
FLOW CONTROLLER Button	The FLOW CONTROLLER button displays a list of flow controllers compatible with GuideTRAX V3. The required flow controller can be selected from the available list of controllers. Refer to Table 7-1 below to see what information is reported by compatible flow controllers.
OK Button	The OK button will update the selected actions, close the window and return to the Edit Rig window.
CANCEL Button	The CANCEL button will ignore any selected actions, close the window and return to the Edit Rig window.

Table 7-1: GuideTRAX V3 - Flow Controller Compatibility Chart

Compatible Flow Controllers	Send Master	Receive Master	AutoSPRAY	Read Sections	Read Boom Configuration	Receive Actual Rate
Apollo 8000		YES				YES
BA7000		YES	YES	YES		
Farmscan 2400	YES			YES	YES	YES
Farmscan 24V1	YES			YES	YES	YES
Hardi 5500		YES*	YES	YES	YES	YES
KEE Eagle		YES	YES	YES		
MSBI		YES		YES		
Raven Series		YES*		YES	YES	YES
RINEX Toggle Box		YES				

Interface cables to suit each particular controller may be purchased from RINEX.

* Only reads Master when AutoSPRAY is not on.

- **Steer Controller Settings**

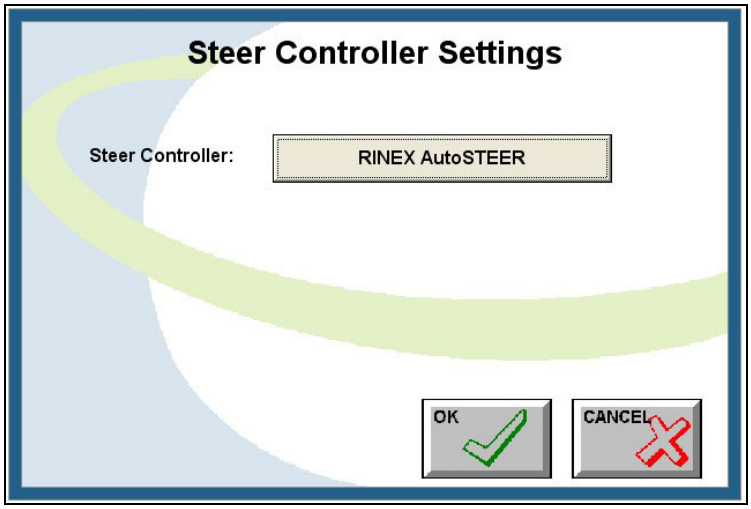


Figure 7-30: Steer Controller Settings Window

Overview: The Steer Controller Settings window, shown in Figure 7-30 allows the type of steer controller to be selected.

Access: **SETUP** **VEHICLE SETUP** **RIG SETUP** **NEW** or **EDIT** **STEER CONTROLLER**

Name	Function
STEER CONTROLLER Button	The STEER CONTROLLER button displays a list of steer controllers compatible with GuideTRAX V3 for AutoSTEER. The required steer controller can be selected from the available list of controllers.
OK Button	The OK button will update the selected actions, close the window and return to the Edit Rig window.
CANCEL Button	The CANCEL button will ignore any selected actions, close the window and return to the Edit Rig window.

7.3.4.3 Switch Setup

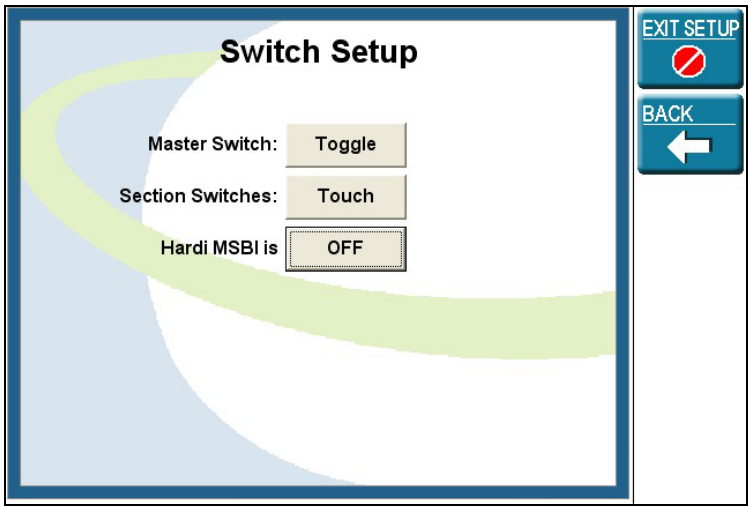


Figure 7-31: The Switch Setup Window

Overview: The Switch Setup window, see Figure 7-31 allows the system to be configured with different switches for starting and stopping of recorded treatment data.

Access: **SETUP** **VEHICLE SETUP** **SWITCH SETUP**

Name	Function
MASTER SWITCH Button	The MASTER SWITCH button selects the switch device that is used for starting and stopping of recorded treatments.
SECTION SWITCHES Button	The SECTION SWITCHES button selects the device that is used for starting and stopping of individual boom sections treatments.
HARDI MSBI Button	The HARDI MSBI button must be ON for use with a MSBI connected to a HARDI spray rate controller. In all other circumstances this button must be OFF.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.5 AutoSPRAY

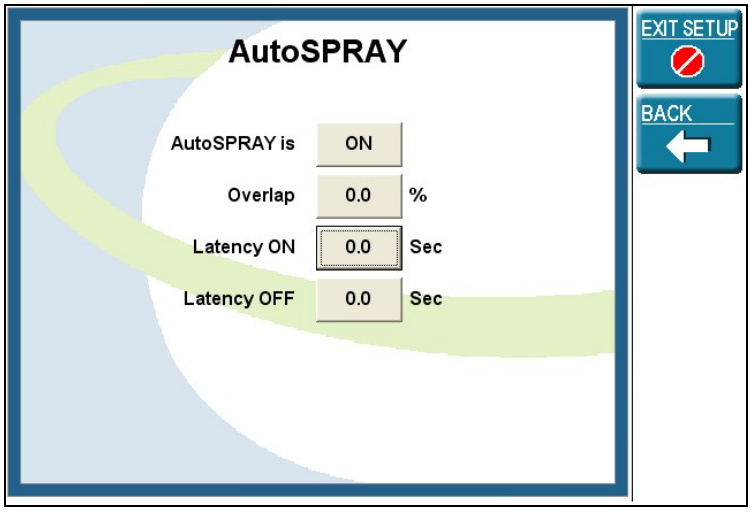


Figure 7-32: The AutoSPRAY Window

Overview: The AutoSPRAY window, see Figure 7-32 allows configuration of AutoSPRAY settings.

Access: **SETUP** **AUTOSPRAY**

Name	Function
AutoSPRAY Button	The AutoSPRAY button turns AutoSPRAY ON or OFF. When AutoSPRAY is ON, AutoSPRAY controls the spray state of each boom section.
OVERLAP Button	The OVERLAP button selects a keyboard to enter a value for spray overlap. AutoSPRAY Overlap is the area (expressed as a percentage) which has been missed, that the system will tolerate. See Section 8.2.2.
LATENCY ON Button	The LATENCY ON button selects a keyboard to enter a value for Latency ON. The Latency ON value is the time it takes for product to start emerging from the spray nozzles once AutoSPRAY has turned spraying on. See Section 8.2.3.

LATENCY OFF Button	The LATENCY OFF button selects a keyboard to enter a value for Latency OFF. The Latency OFF value is the time it takes for product to start emerging from the spray nozzles once AutoSPRAY has turned spraying on. See Section 8.2.3.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.6 Transfer Files

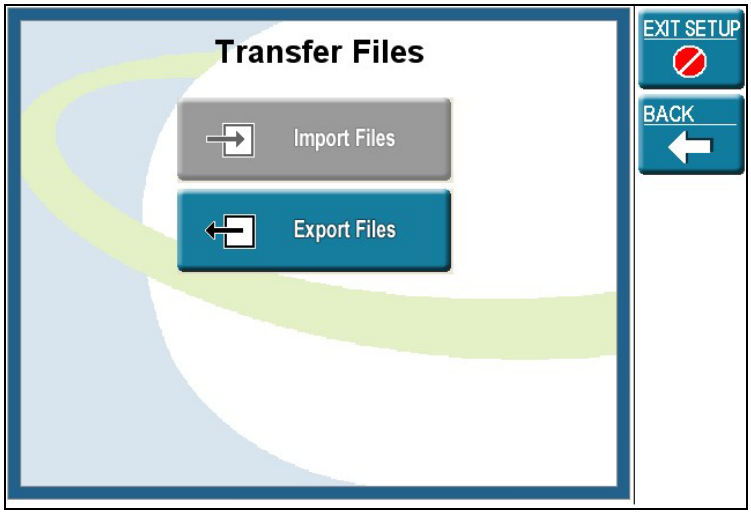


Figure 7-33: The Transfer Files Window

Overview: The Transfer Files Window, see Figure 7-33 allows treatment data files to be exported.

Access: **SETUP** **TRANSFER FILES**

Name	Function
IMPORT FILES Button	The IMPORT FILES button is not operational in the HT model.
EXPORT FILES Button	The EXPORT FILES button will copy all Archived treatment data on the Saturn H system to the USB storage device.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.7 Guide Options

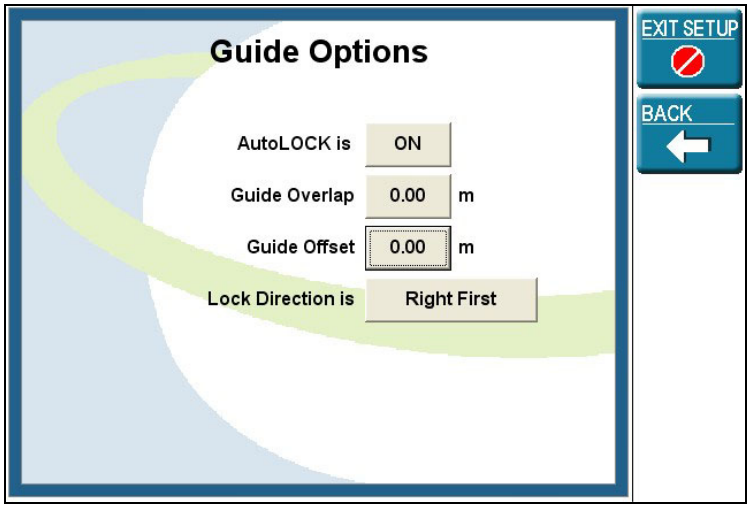


Figure 7-34: The Guide Options Window

Overview: The Guide Options window, see Figure 7-34 allows selection and editing of guidance options..

Access: **SETUP** **MORE** **GUIDE OPTIONS**

Name	Function
AutoLOCK Button	When AutoLOCK is ON, GuideTRAX constantly enables lock guidance in the field after LOCK has been selected once until guidance is turned off.
GUIDE OVERLAP Button	The GUIDE OVERLAP button selects a keyboard to enter a value for guide overlap. The guide overlap value results in an overlap in treatment. See Section 5.3.1.
GUIDE OFFSET Button	The GUIDE OFFSET button selects a keyboard to enter a value for guide offset. The guide offset value shifts the parallel guidelines (AB points) for the whole farm. See Section 5.3.2.

LOCK DIRECTION Button	The LOCK DIRECTION button selects the search pattern for Lock guidance, based on the previous treatment swath. A previous treatment swath must be within one swath width of the vehicle for a guideline to be generated. Right First – searches for a previous treatment swath on the Right first. If no previous treatment swath is found, it searches on the left. Left First – searches for a previous treatment swath on the Left first. If no previous treatment swath is found, it searches on the right. Right Only – searches **only** to the right for a previous treatment swath. Left Only – searches **only** to the left for a previous treatment swath.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.8 Lightbar Setup

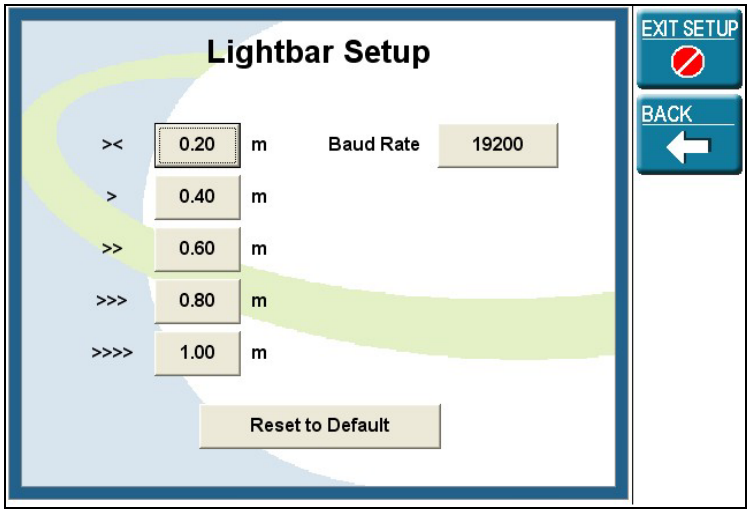


Figure 7-35: The Lightbar Setup Window

Overview: The Lightbar Setup window, see Figure 7-35 allows editing of lightbar guidance/distance limits and baud rate (communication speed). See Section 6.3.5 for more information about how to set the lightbar limits.

Access: **SETUP** **MORE** **LIGHTBAR SETUP**

Name	Function
>< Button	The >< button selects the keyboard for the value (between 0 to 100 metres) to be entered. The value must be greater than 0m and less than the > value.
> Button	The > button selects the keyboard for the value to be entered. The value must be greater than the>< value and less than 100m.
>> Button	The >> button selects the keyboard for the value to be entered. The value must be greater than the> value and less than 100m.
>>> Button	The >>> button selects the keyboard for the value to be entered. The value must be greater than the>> value and less than 100m.

>>>> Button	The >>> button selects the keyboard for the value to be entered. The value must be greater than the>>> value and less than 100m.
BAUD RATE Button	The BAUD RATE button allows lightbars which communicate at different baud rates to be used with the Saturn H series. The system will need to be restarted once the baud rate has been changed.
RESET TO DEFAULT Button	Touching the RESET TO DEFAULT button returns all Lightbar settings to factory defaults.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.9 Virtual Road Setup

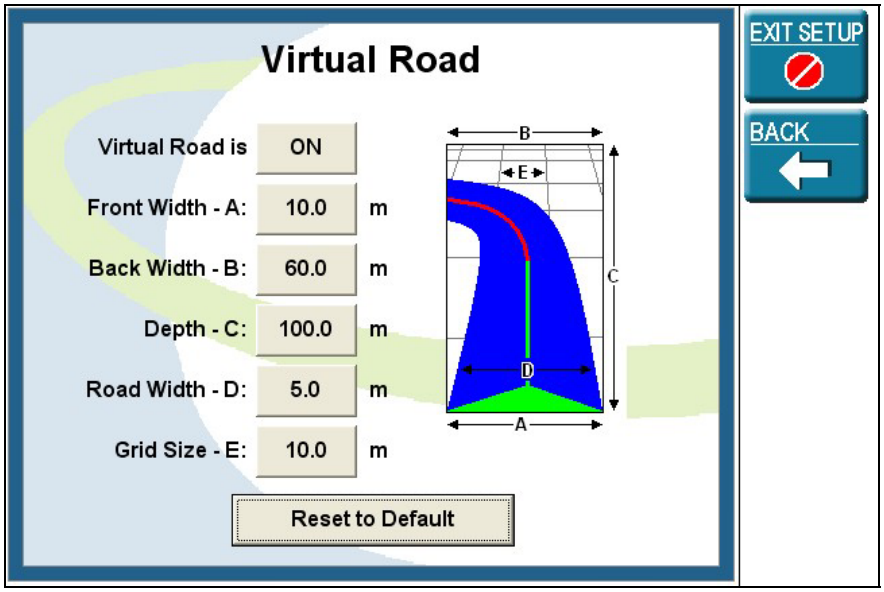


Figure 7-36: The Virtual Road Window

Overview: The Virtual Road window, see Figure 7-36 allows editing of Virtual Road dimensions. See Section 6.3.4 for more information about customising the Virtual Road.

Access: SETUP MORE VIRTUAL ROAD SETUP

Name	Function
VIRTUAL ROAD Button	The VIRTUAL ROAD button turns the Virtual Road window ON or OFF. When ON, the Virtual Road window appears to the left of the Map screen. When OFF, the Virtual Road window disappears from the Main screen, enlarging the Map screen.
FRONT WIDTH Button	The FRONT WIDTH button opens the numerical keyboard to enter the value of the front width of the Virtual Road.
BACK WIDTH Button	The BACK WIDTH button opens the numerical keyboard to enter the value of the back width of the Virtual Road.

DEPTH Button	The DEPTH button opens the numerical keyboard to enter the value of the depth of the Virtual Road.
ROAD WIDTH Button	The ROAD WIDTH button opens the numerical keyboard to enter the value of the road width of the Virtual Road.
GRID SIZE Button	The GRID SIZE button opens the numerical keyboard to enter the value of the grid size displayed in the Virtual Road window
RESET TO DEFAULT Button	Touching the RESET TO DEFAULT button returns all Virtual Road settings to factory defaults.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.10 GPS Setup

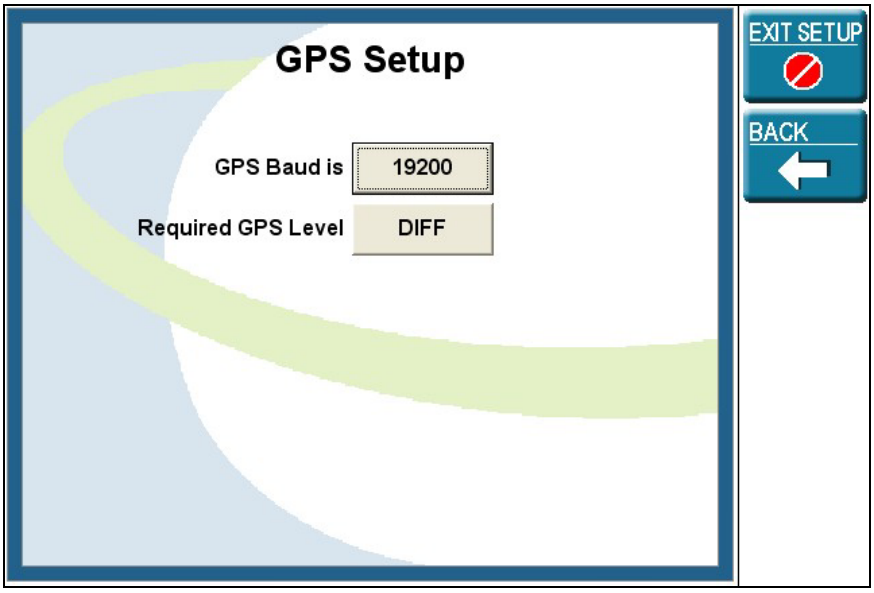


Figure 7-37: The GPS Setup Window

Overview: The GPS Setup window, see Figure 7-37 allows selection of GPS Baud rate (communication speed) and accuracy level. See Section 6.1 for more information about GPS configurations.

Access: **SETUP** **MORE** **GPS SETUP**

Name	Function
GPS BAUD Button	The GPS BAUD button allows the baud rate setting in GuideTRAX to be selected to match that of the GPS receiver. 4800, 9600 or 19200
REQUIRED GPS LEVEL Button	The REQUIRED GPS LEVEL button allows selection of the level of accuracy required. DIFF – differentially corrected GPS data. DIFF is the recommended level. GPS – uncorrected GPS data. Less accurate than DIFF.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.11 Remote Buttons

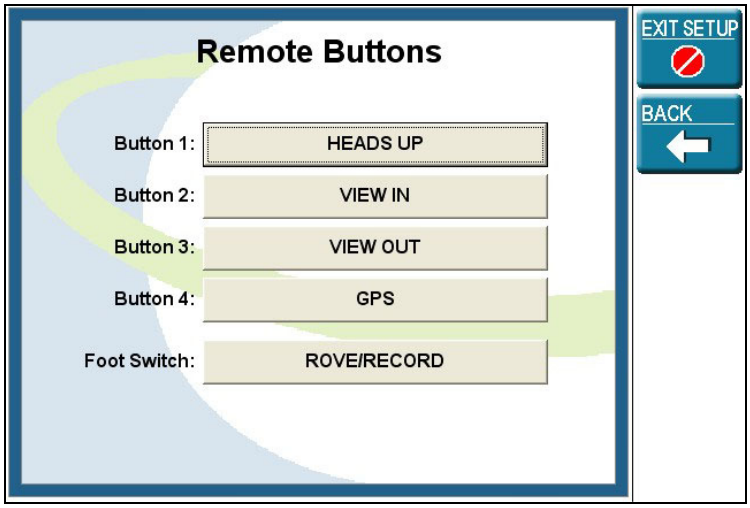


Figure 7-38: The Remote Buttons Window

Overview: The Remote Buttons window, see Figure 7-38 allows the RINEX Button Box and Footswitch to be configured. See Sections 6.6 and 6.7 for a complete list of each function and for more information about configuring Remote Buttons.

Access: **SETUP** **MORE** **REMOTE BUTTONS**

Name	Function
BUTTON 1 Button	BUTTON 1 selects the Remote Buttons Window from which a function for the Button may be selected. If no Button box is attached the setting will have no effect.
BUTTON 2 Button	BUTTON 2 selects the Remote Buttons Window from which a function for the Button may be selected. If no Button box is attached the setting will have no effect.
BUTTON 3 Button	BUTTON 3 selects the Remote Buttons Window from which a function for the Button may be selected. If no Button box is attached the setting will have no effect.
BUTTON 4 Button	BUTTON 4 selects the Remote Buttons Window from which a function for the Button may be selected. If no Button box is attached the setting will have no effect.

FOOT SWITCH Button	The FOOT SWITCH button selects the Remote Buttons Window from which a function for the Foot Switch may be selected. If no Foot Switch is attached the setting will have no effect.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.12 Sound Setup

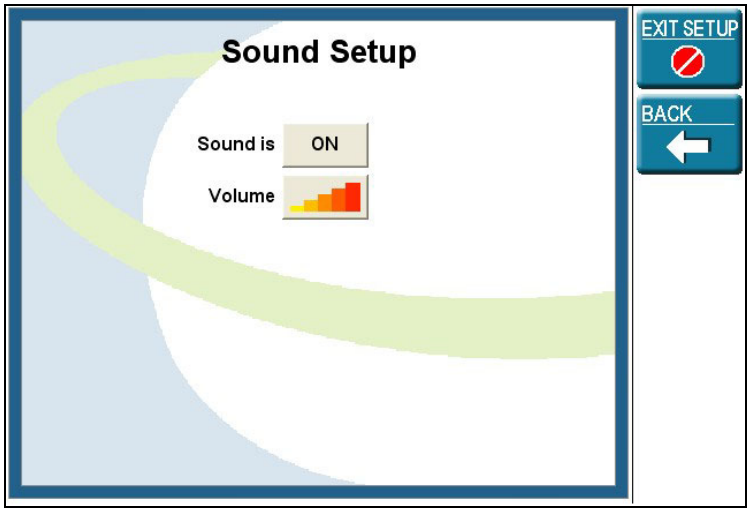


Figure 7-39: The Sound Setup Window

Overview: The Sound Setup window, see Figure 7-39 allows sound to be turned on or off and volume level to be adjusted for compatible speakers or headphones connected to the Audio jack on the Saturn H interface unit.

Access: **SETUP** **MORE** **SOUND SETUP**

Name	Function
SOUND Button	The SOUND button turns sound ON or OFF.
VOLUME Button	The VOLUME button toggles through 5 levels of sound. Each time the button is touched, the sound level will be increased by one notch and the button display will change accordingly. When the button displays maximum sound level as shown in Figure 7-39, the next time it is touched the volume will drop back to the minimum level.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.13 Memory Setup

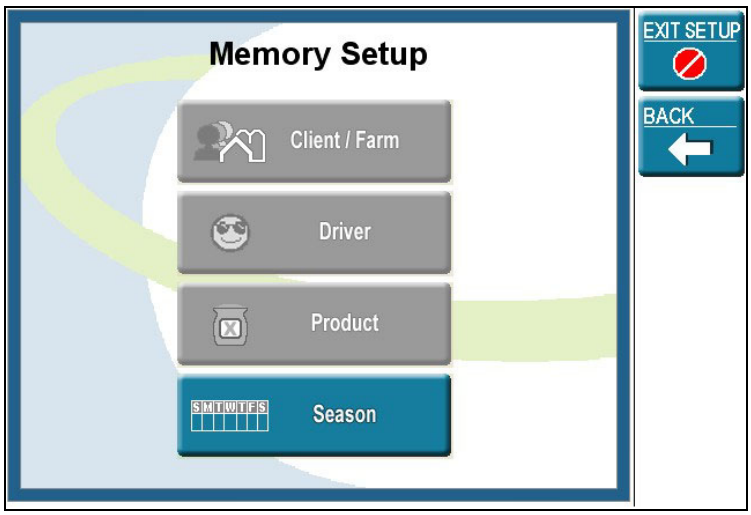


Figure 7-40: The Memory Setup Window

Overview: The Memory Setup window, see Figure 7-40 allows the season to be changed.

Access: **SETUP** **MORE** **MEMORY SETUP**

Name	Function
CLIENT/FARM Button	The CLIENT/FARM button is not operational in the HT model.
DRIVER Button	The DRIVER button is not operational in the HT model.
PRODUCT Button	The PRODUCT button is not operational in the HT model.
SEASON Button	The SEASON button selects the Season Setup window to allow addition and deletion of cropping seasons.
EXIT SETUP Button	The EXIT SETUP button will update the selected actions, close the Window and return to the Main menu.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.3.13.1 Season Setup

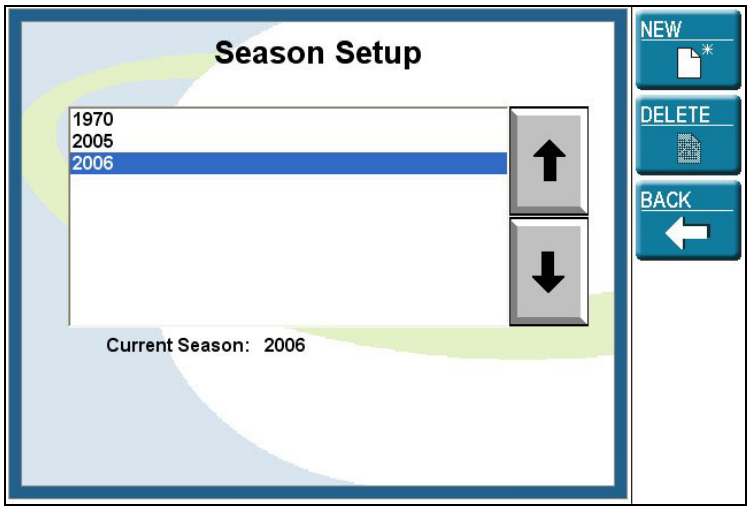


Figure 7-41: The Season Setup Window

Overview: The Season Setup Window, see Figure 7-41 allows the season to be changed.

Access: **SETUP** **MORE** **MEMORY SETUP**

Name	Function
↑ (UP) Button	The UP button selects the previous season.
↓ (DOWN) Button	The DOWN button selects the next season.
NEW Button	The NEW button displays a warning message advising that all tanks must be emptied and all treatments completed for the currently selected season, and requesting confirmation of the NEW action. When OK is touched a keyboard is displayed to allow the new season to be entered (usually the next or current calendar year, e.g.: 2006).
DELETE Button	The DELETE button displays a seeking confirmation to delete all data in the selected season. It also gives the option to create a summary of treatments recorded for the season to be deleted. When OK is pressed, the selected season will be deleted.
BACK Button	The BACK button will update the selected actions, close the Window and return to the previous Menu.

7.4 Records

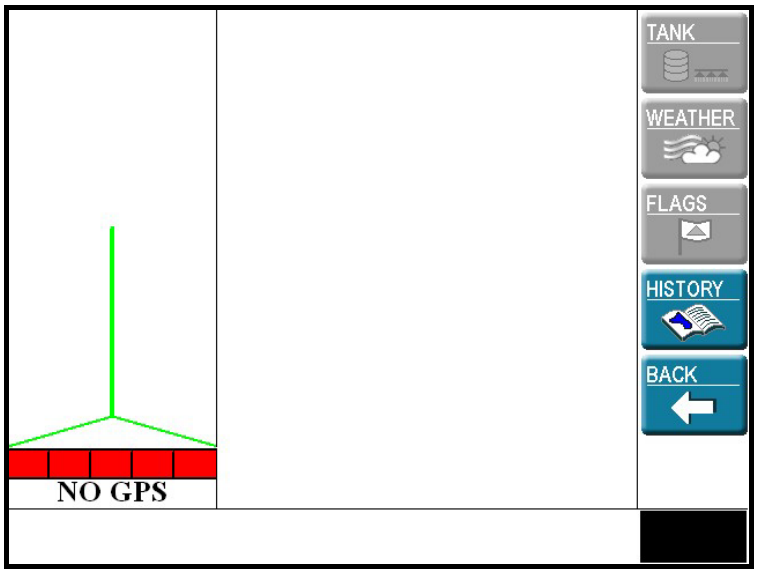


Figure 7-42: The Records Menu

Overview: The RECORDS Menu as illustrated in Figure 7-42 allows treatment records to be maintained.

Access: **RECORDS**

Name	Button	Function
TANK		The TANK button is not operational in the HT model.
WEATHER		The WEATHER button is not operational in the HT model.
FLAGS		The FLAGS button is not operational in the HT model.
HISTORY		The HISTORY button selects the History window, to allow Archived treatment records to be viewed.
BACK		The BACK button returns the system to the Main Menu.

7.4.1 History Menu

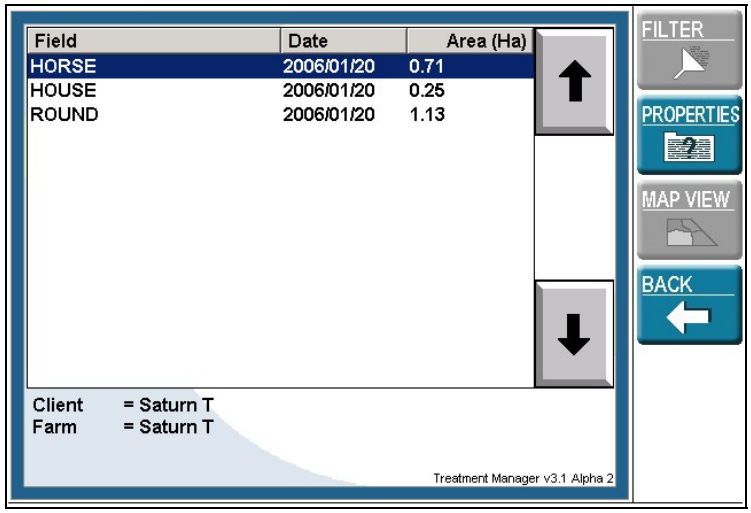


Figure 7-43: History Window

Overview: The History window as illustrated in Figure 7-43 allows treatment history records to be viewed and AB points to be loaded.

Access: RECORDS HISTORY

Name	Button	Function
FILTER		The FILTER button is not operational in the HT model.
PROPERTIES		The PROPERTIES button displays the Treatment Properties Window.
MAP VIEW		The MAP VIEW button is not operational in the HT model.
BACK		The BACK button returns the system to the Records Menu.

7.4.1.1 Treatment Properties

- **Product Tab**

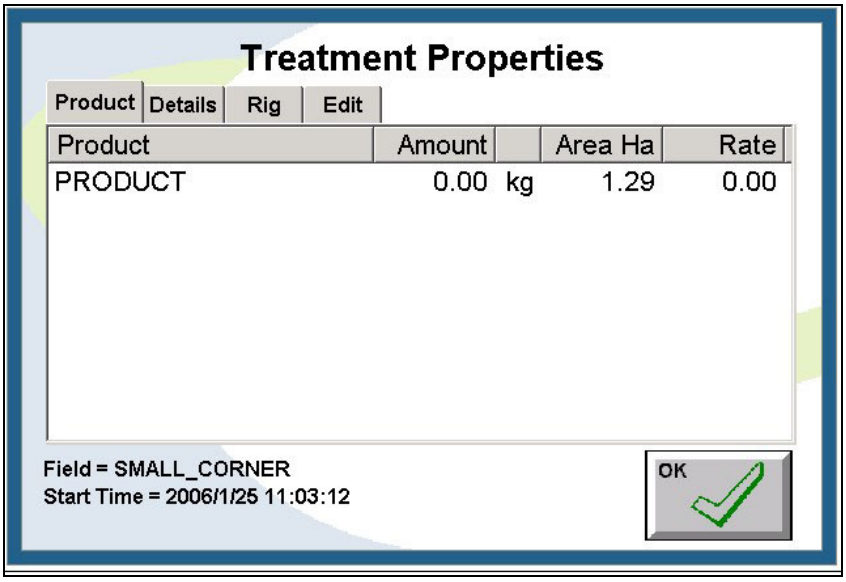


Figure 7-44: The Treatment Properties Product Window

Overview: The Treatment Properties Product window, see Figure 7-44 allows details of the product used in the selected field treatment to be viewed.

Access: **RECORDS** **HISTORY** **PROPERTIES**

Name	Function
PRODUCT Column	The PRODUCT column lists each product used when treating the selected field.
AMOUNT Column	The AMOUNT column displays the amount of each product used when treating the selected field.
AREA HA Column	The AREA HA column shows the area treated with each product.
RATE Column	The RATE column shows the average rate at which each product was applied.
FIELD	The name of the selected field about which Product details are being displayed.
START TIME	The START TIME field shows the date and time when the selected treatment was started in this field.
OK Button	The OK button closes the window and returns to the Treatment History Window.

- **Details Tab**

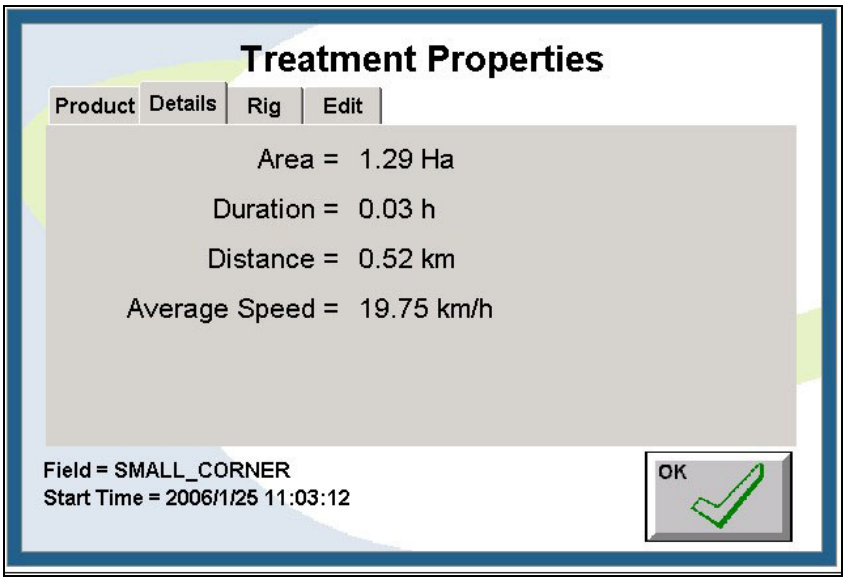


Figure 7-45: The Treatment Properties Details Window

Overview: The Treatment Properties window, see Figure 7-45 allows details of a particular treatment to be viewed.

Access: **RECORDS** **HISTORY** **PROPERTIES** **DETAILS**

Name	Function
AREA	The area treated in the selected field.
DURATION	The time taken to complete the field.
DISTANCE	The distance travelled when applying product to the selected field.
AVERAGE SPEED	The average speed recorded while applying product to the selected field.
FIELD	The name of the selected field about which details are being displayed.
START TIME	The START TIME field shows the date and time when the selected treatment was started in this field.
OK Button	The OK button closes the window and returns to the History Window.

- **Rig**

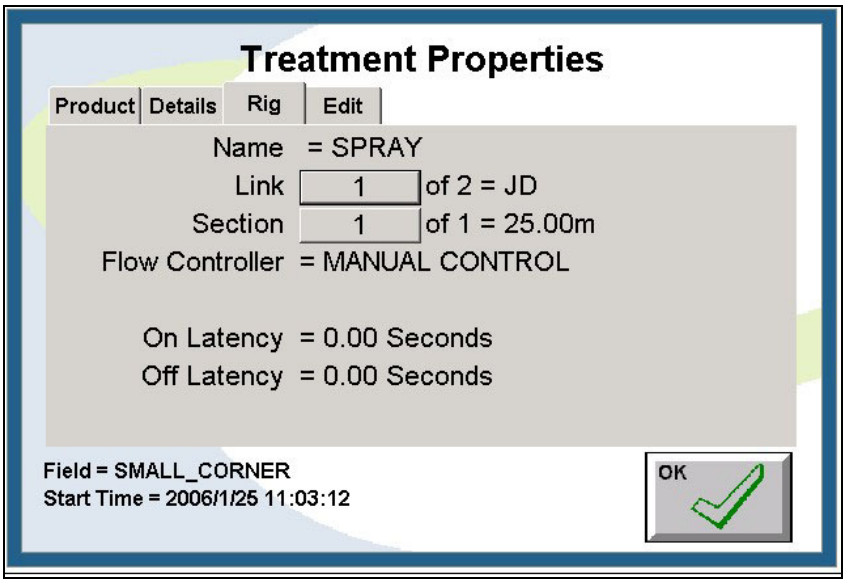


Figure 7-46: The Treatment Properties Rig Window

Overview: The Treatment Properties Rig window, see Figure 7-46 allows details of a particular treatment to be viewed.

Access: RECORDS HISTORY PROPERTIES RIG

Name	Function
NAME	The name of the Rig used in the selected field.
LINK Button	The LINK button toggles through each link in the Rig (used in the selected field), and displays the name of the selected link on the right.
SECTION	The SECTION button toggles through each boom section and displays the width of each section (used in the selected field) on the right.
FLOW CONTROLLER	The Flow Controller used in the selected field.
ON LATENCY	The On Latency setting used in the selected field.
OFF LATENCY	The Off Latency setting used in the selected field.

FIELD	The name of the selected field about which details are being displayed.
START TIME	The START TIME field shows the date and time when the selected treatment was started in this field.
OK Button	The OK button closes the window and returns to the Treatment History Window.

- **Edit**

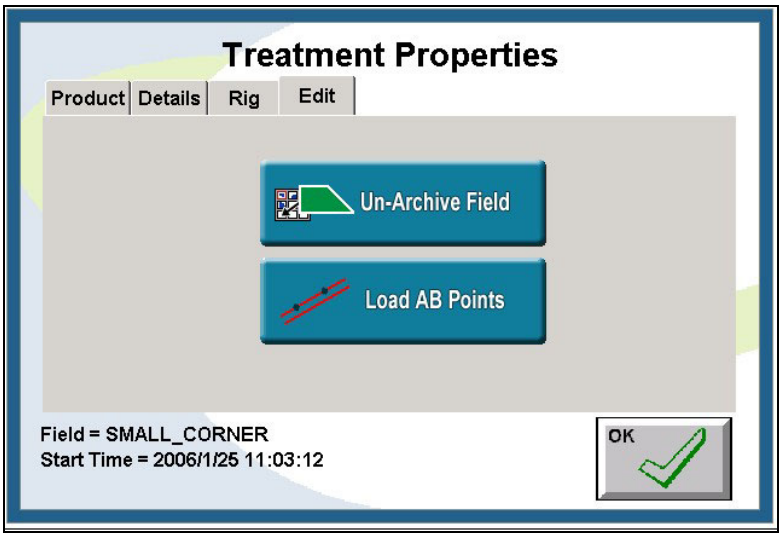


Figure 7-47: The Treatment Properties Edit Window

Overview: The Treatment Properties Edit window, see Figure 7-47 allows details of a particular treatment to be viewed.

Access: **RECORDS** **HISTORY** **PROPERTIES** **EDIT**

Name	Function
UN-ARCHIVE FIELD Button	The UN-ARCHIVE FIELD button displays a message seeking confirmation and when OK is pressed, removes the selected field from permanent memory and places it in an empty Virtual Memory slot so that more treatment can be added to the field.
LOAD AB POINTS Button	The LOAD AB POINTS button displays a confirmation message and when OK is pressed, loads the last AB points used in the selected field and deletes any currently set AB points.
FIELD	The name of the selected field about which details are being displayed.
START TIME	The START TIME field shows the date and time when the selected treatment was started in this field.
OK Button	The OK button closes the window and returns to the Treatment History Window.

8

AutoSPRAY

The AutoSPRAY controller is designed to connect to your existing Spray Controller and the Saturn “H” guidance system to provide automatic boom section control. This will greatly reduce the need for manually switching sections ON or OFF when going over previously sprayed crop or pasture. Its ability to automatically control the spraying state of the sections relieves the operator from an arduous task which requires split second timing on multiple switches. The AutoSPRAY controller can be interfaced with most existing spray rate controllers.

The AutoSPRAY controller can be used in many situations as shown in Figure 8-1.

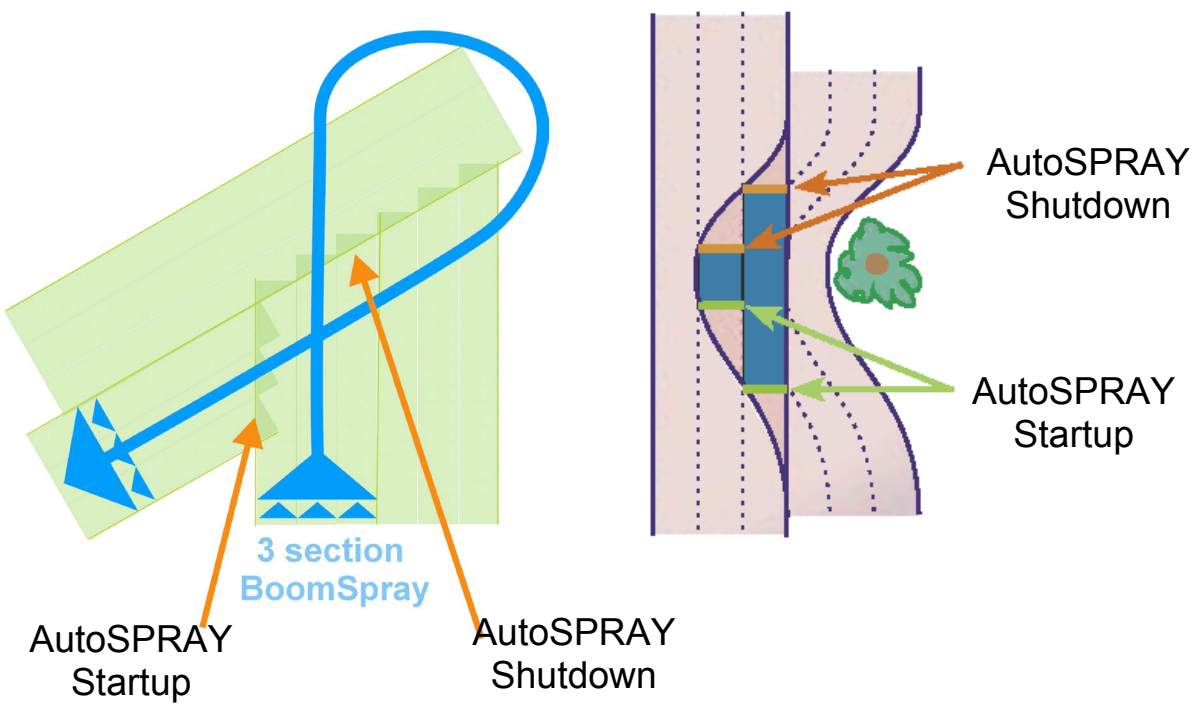


Figure 8-1: AutoSPRAY Uses

8.1 AutoSPRAY Overview

The AutoSPRAY is compatible with a wide variety of spray rate controllers and is easily installed. RINEX have a range of easy to install interface cables available for some of the more popular spray rate controllers on the market. RINEX also manufacture a generic AutoSPRAY cable which can be used in place of a controller specific cable and is therefore compatible with the full range of spray rate controllers as shown in Appendix 3. A schematic of the Saturn "H" system and AutoSPRAY controller is shown in Figure 8-2.

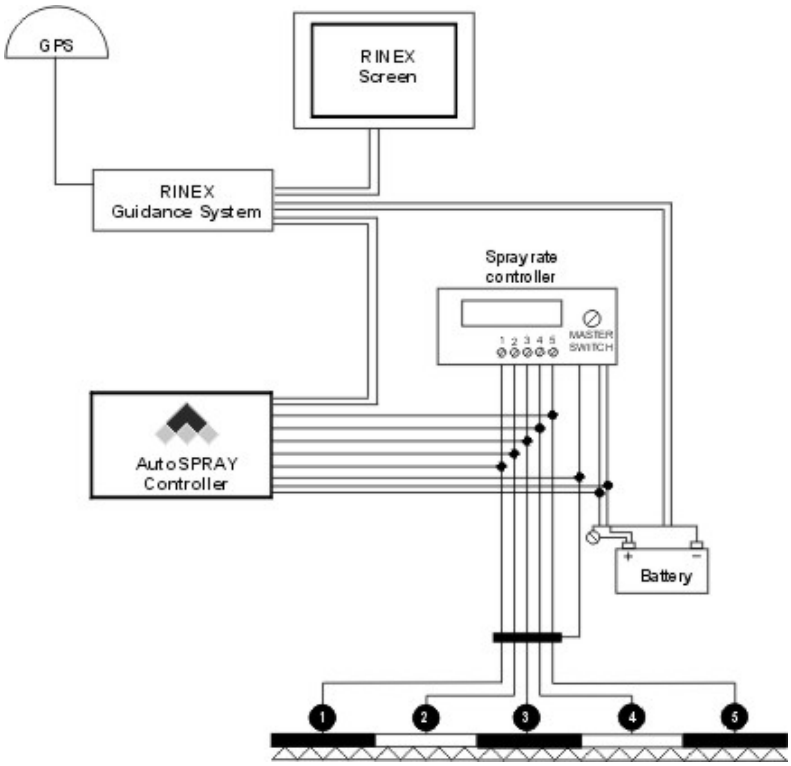


Figure 8-2: AutoSPRAY Overview

8.2 Configuring AutoSPRAY

Prior to using the AutoSPRAY option it is necessary to ensure that the overall system is correctly configured to ensure that system accurately controls the spray rate controller.

8.2.1 Enabling the AutoSPRAY Option

In order to use the AutoSPRAY option it will be necessary to first enter the correct password and ensure that the option is enabled as described in Section 6.1.

The AutoSPRAY function is now enabled on the system and it can be switched ON & OFF as necessary via the AutoSPRAY Window.

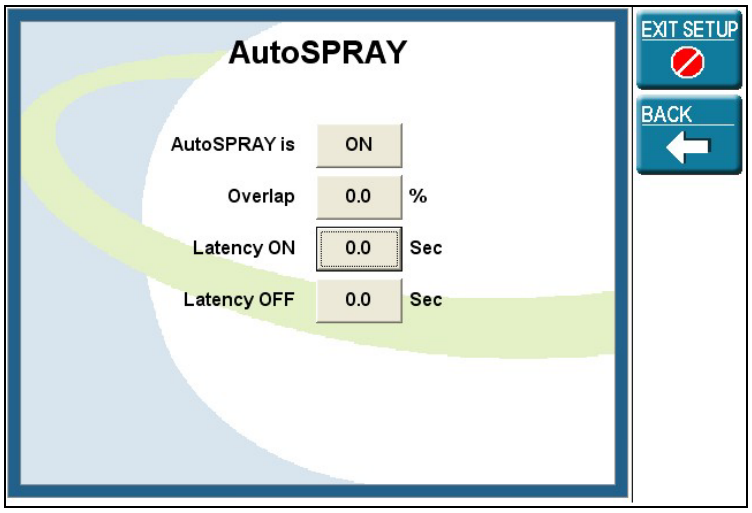


Figure 8-3: The AutoSPRAY Window

Overview: The AutoSPRAY Window, see Figure 8-3 allows AutoSPRAY to be turned On or Off and allows the system to be configured with Overlap and Latency values.

Access: SETUP AUTOSPRAY

8.2.2 Setting AutoSPRAY Overlap

AutoSPRAY controls the overlap tolerance which is used to decide when to turn valves on or off. When set to its default of 0%, the system will turn the valves on whenever any part of the sensed area has not been sprayed. It is effectively the percent of miss that the system will tolerate. If the value is increased, the system will not turn the valves on when traversing over a small missed area such as a line between two spray swaths.

8.2.3 Setting AutoSPRAY Latency Values

The most critical parameter with AutoSPRAY is the latency value. Latency is the timing delay from when the switch status is toggled between ON and OFF, and to when the spray nozzle on the boom starts and stops spraying of the water and chemical mixture.

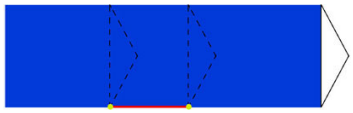
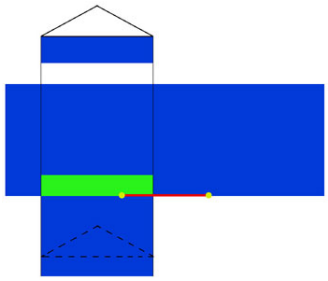
The latency value will vary between different spray rigs and is beyond the scope of this manual to describe why they vary. However the fact that they do vary is important and the values must be accurately determined. Furthermore the latency may vary between switching ON and Switching OFF, hence it is necessary to determine both values.

Once the latency values have been computed they are recorded in the AutoSPRAY Window as shown in Figure 8-3.

8.2.3.1 Determining the AutoSPRAY Latency

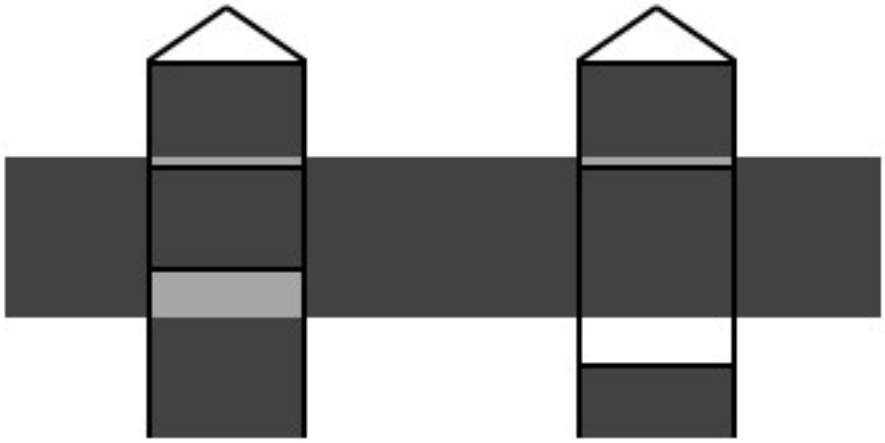
The quickest way to estimate the latency of the sprayer is to use a stop watch, turn a spray section on and time the delay between this action and when spray is coming out the nozzle on the boom. This may be a very small value (a few tenths of a second and hard to measure accurately).

For a more accurate measurement, use the following procedure:

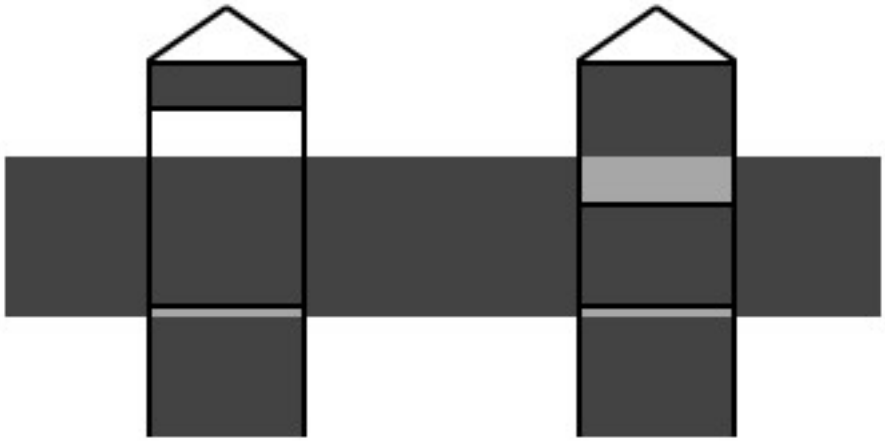
Step	Instruction	Diagram
	OFF Latency	
1	Drive slowly in a straight line down the field for 200m with the sprayer on. The tank should have water only for the purpose of this exercise. Have another person mark the end nozzle of the boom with two pegs and a rope half way along the spray run.	
2	At right angles to the pervious spray run, spray at 20km/hr across the spray mark with one end of the boom crossing over the rope. Ensure that you have allowed enough distance before crossing over the line for the boom trailer to straighten up behind the tractor. Have someone measure the distance from the rope to where the sprayer actually turned off.	

Step	Instruction	Diagram
3	Metric Calculations Speed(km/h) = The speed of the vehicle in kilometres per hour Distance(m) = The distance from the rope to where the sprayer reacted in metres. Calculate the latency using this formula: Latency(s) = Distance(m) ÷ Speed(km/h) x 3.6 For example Assuming the operator was travelling at 20km/hr and the distance from the rope to where the sprayer reacted is 5m: Latency(s) = 5(m) ÷ 20(km/h) x 3.6 = 0.9 seconds.	
4	Imperial Calculations Speed(mph) = The speed of the vehicle in miles per hour. Distance(ft) = The distance from the rope to where the sprayer reacted in feet. Calculate the latency using this formula: Latency(s) = Distance(ft) ÷ Speed(mph) x 0.68 For example Assuming the operator was traveling at 12mph and the distance from the rope to where the sprayer reacted is 16ft: Latency(s) = 16(ft) ÷ 12(mph) x 0.68 = 0.9 seconds	
5	Repeat steps 1 to 4, altering the latency figure by plus or minus 0.1 seconds, until the optimum result is achieved.	
	ON Latency	
6	Often the latency time for the sprayer to switch on will differ from the time to switch off. Repeat Steps 1 to 5 above looking at the reaction time to turn on, to determine the ON latency.	

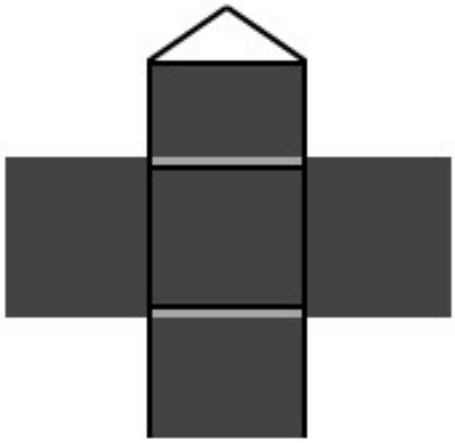
The following examples show possible scenarios and how to resolve the latency settings for optimum control of the AutoSPRAY.



OFF Latency Set Too Low ON Latency Set Too High



ON Latency Set Too Low OFF Latency Set Too High



Optimum ON and OFF Latency Settings

8.3 Using AutoSPRAY in the Field

The following is a step by step guide to getting the RINEX AutoSPRAY up and running.

Step	Instruction
1	Start the Saturn “H” system by turning the vehicle ignition ON and the AutoSPRAY system attached. The system should be operational and ready to proceed as described in Section 2.
2	Check that the Power LEDs on the AutoSPRAY controller front panel is ON.
3	Turn the spray rate controller ON, all boom section switches are to be in the OFF position.
4	Turn the spray rate controller Master switch to the ON position.
5	Start to move the vehicle. The boom sections will automatically switch ON as the vehicle moves over a non-treated area and will switch OFF over a treated area which has been recorded by the system.
6	As the field is being treated, the Map Screen will show where intentional overlap has occurred and this will be green in colour as shown in Figure 8-4.
7	When the field has been completely treated, turn the master switch OFF.
8	If you wish to stop working, simply turn the vehicle ignition off to shutdown the entire system.
9	If you wish to continue working in a different field, see Section 4.3 on starting a New Field.

When AutoSPRAY is being used to control the spraying state of the boom, the overlapped areas can be viewed on the Map Screen. The overlapped areas are displayed in green, the non-overlapped areas are displayed in blue and the non-treated areas are displayed in white. To view the overlapped areas, the view must be in North Up mode.

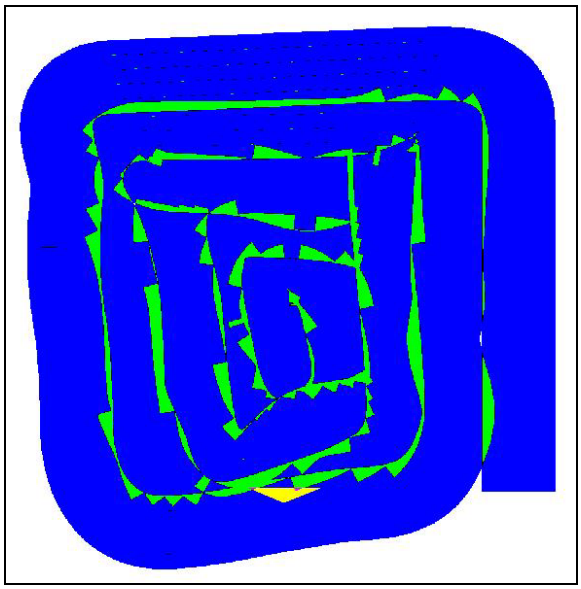


Figure 8-4: A Typical Map Screen with AutoSPRAY Overlap

8.3.1 Viewing the Percentage Overlap

The percentage of overlapped areas can be viewed as a field is treated as shown in Figure 8-4. This can be viewed on the lower status bar on the bottom of the map screen – see Figure 8-5 below.

If the lower status bar is not showing the percentage overlap, tap it until it is displayed and ensure it is set to be displayed – see Section 7.3.3.1.

Figure 8-5:The Percentage Overlap On The Status Bar

9

AutoSTEER

The AutoSTEER option is an add-on to the RINEX guidance product range that allows the guidance system to AutoSTEER the vehicle along a straight line providing optimal accuracy.

RINEX AutoSTEER is compatible with the following AutoSTEER systems:

- RINEX AutoSTEER – see Section 9.1.
- Beeline Arro – see Section 9.2.

9.1 The RINEX AutoSTEER System

9.1.1 Connecting the RINEX AutoSTEER Controller

Refer to the Installation Manual supplied with your AutoSTEER kit.

9.1.2 Enabling RINEX AutoSTEER

When the RINEX AutoSTEER controller has been fitted to your vehicle and connected to the Saturn HT, the option must be activated in GuideTRAX V3.

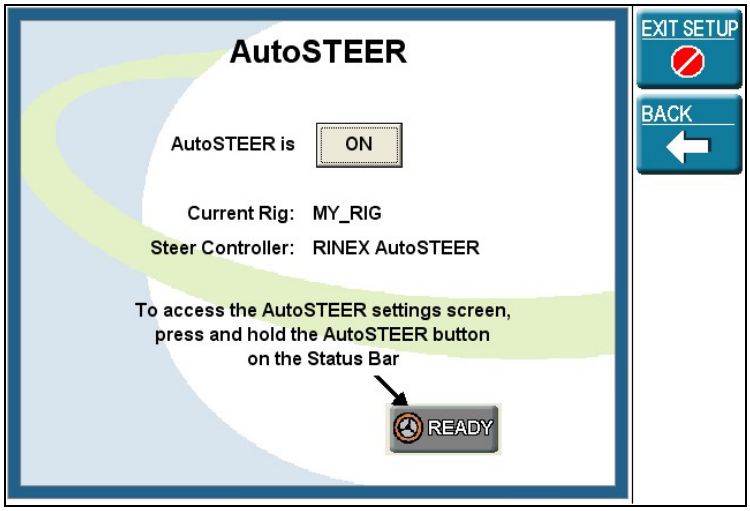


Figure 9-1: AutoSTEER Window

Overview: The AutoSTEER Window allows AutoSTEER to be turned ON/OFF.

Access: **SETUP** **AUTOSTEER**

1) From the AutoSTEER Window (see Section 7.3.2) select AutoSTEER On by touching the AutoSTEER ON/OFF button.

2) Now touch OK. A Disclaimer window will be displayed as shown in Figure 9-2.

3) Read the information carefully and if you agree press OK, if you do not agree with this disclaimer, press cancel and the system will not activate steering. The disclaimer will be displayed every time the system is started.

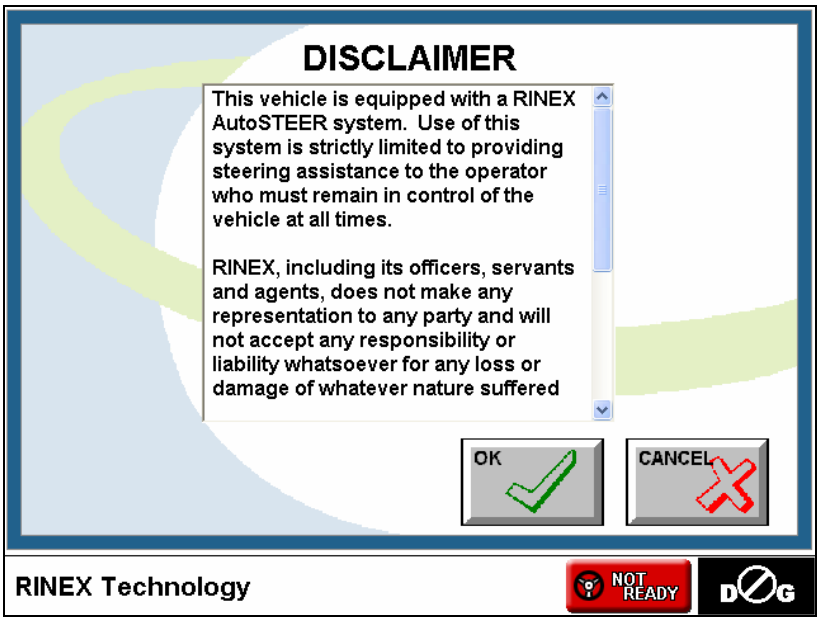

DISCLAIMER
This vehicle is equipped with a RINEX AutoSTEER system. Use of this system is strictly limited to providing steering assistance to the operator who must remain in control of the vehicle at all times.
RINEX, including its officers, servants and agents, does not make any representation to any party and will not accept any responsibility or liability whatsoever for any loss or damage of whatever nature suffered
OK
CANCEL
RINEX Technology
NOT READY

Figure 9-2: AutoSTEER Disclaimer Window

9.1.3 RINEX AutoSTEER Screens

9.1.3.1 RINEX AutoSTEER Status Window

Figure 9-3: RINEX AutoSTEER Status Window

Overview: The RINEX AutoSTEER Window, see Figure 9-3 provides AutoSTEER status information and allows testing and changing various RINEX AutoSTEER settings. It is accessed by touching and holding the AutoSTEER Status button at the bottom of the screen in the Status Bar, for 4 seconds.

Access: **AUTOSTEER STATUS**

Name	Function
Controller	Displays the AutoSTEER controller type.
Firmware	Displays the firmware version running on the AutoSTEER controller.
Connected	Displays whether the AutoSTEER controller is connected or not. A GREEN light indicates the controller is connected. A RED light indicates the controller is not connected.

Name	Function
GPS Heading	Displays whether VTG information is being received by the GPS receiver. A GREEN light indicates VTG information is being received. A RED light indicates VTG information is not being received.
Logging	Touching the Logging lights starts recording of steer data to a USB device. If the Logging light is GREEN, then data is being logged. If the Logging light is RED then data is not being logged.
Test Steering	Touching the Test Steering button displays the Test Steering Window.
Calibrate Steering	Touching the Calibrate Steering displays the Calibrate Steering Window.

9.1.3.2 Test Steering

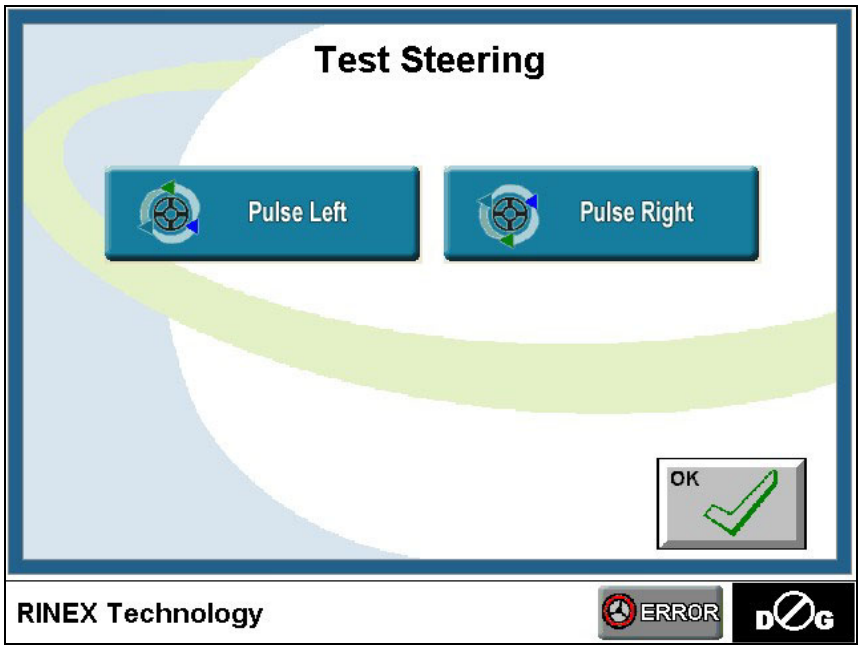


Figure 9-4: The Test Steering Window

Overview: The Test Steering window, see Figure 9-4 allows steering to be tested. The vehicle must be moving slowly (less than 8 km/hour) while tests are carried out.

Access: **AUTOSTEER STATUS** **TEST STEERING**

Name	Function
PULSE LEFT Button	The PULSE LEFT button causes the wheels to pulse left once for two seconds.
PULSE RIGHT Button	The PULSE RIGHT button causes the wheels to pulse right once for two seconds.
OK Button	The OK button returns to the previous screen.

9.1.3.3 Calibrate Steering

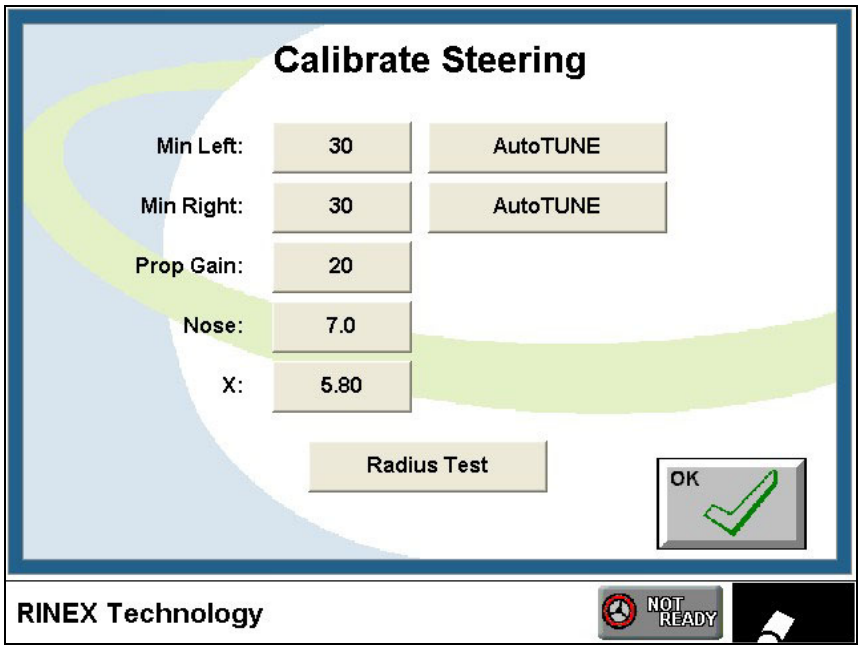


Figure 9-5: The Calibrate Steering Window

Overview: The Calibrate Steering window, see Figure 9-5 allows steering to be calibrated. The vehicle must be moving slowly (about 10 kph) while tests are carried out.

Access: **AUTOSTEER STATUS**

CALIBRATE STEERING

Name	Function
MIN LEFT Button	The MIN LEFT number button displays a numeric keyboard on which the Min Left figure can be entered.
MIN RIGHT Button	The MIN RIGHT number button displays a numeric keyboard on which the Min Right figure can be entered.
PROP GAIN Button	The PROP GAIN number button displays a numeric keyboard on which the Prop Gain figure can be entered.

NOSE Button	The NOSE number button displays a numeric keyboard on which the Nose figure can be entered.
X Button	The X number button displays a numeric keyboard on which the X figure can be entered.
MIN LEFT AUTOCALIBRATE Button	The MIN LEFT AUTOCALIBRATE button displays a series of screens which allow the system to calibrate the steering wheels of the vehicle.
MIN RIGHT AUTOCALIBRATE Button	The MIN RIGHT AUTOCALIBRATE button displays a series of screens which allow the system to calibrate the steering wheels of the vehicle.
RADIUS TEST Button	The RADIUS TEST button displays the Test Radius screen which is used for testing calibration.
OK Button	The OK button returns to the previous screen.

9.1.3.4 Test Radius

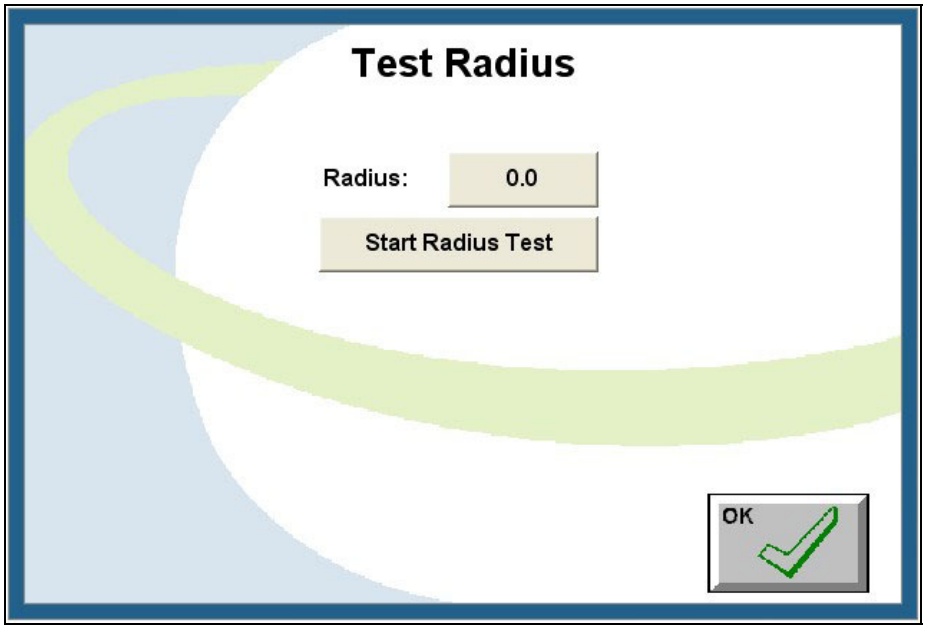


Figure 9-6: The Test Radius Window

Overview: The Test Radius window, see Figure 9-6 allows steering to be calibrated. The vehicle must be moving slowly (about 10 kph) while tests are carried out.

Access: **AUTOSTEER STATUS**
CALIBRATE STEERING **RADIUS TEST**

Name	Function
RADIUS Button	The RADIUS number button displays a numeric keyboard on which the Radius figure can be entered.
START RADIUS TEST Button	The START RADIUS TEST button sends a constant radius figure to the AutoSTEER controller, which is used to test calibration.
OK Button	The OK button returns to the previous screen.

9.1.3.5 AutoCALIBRATE Window

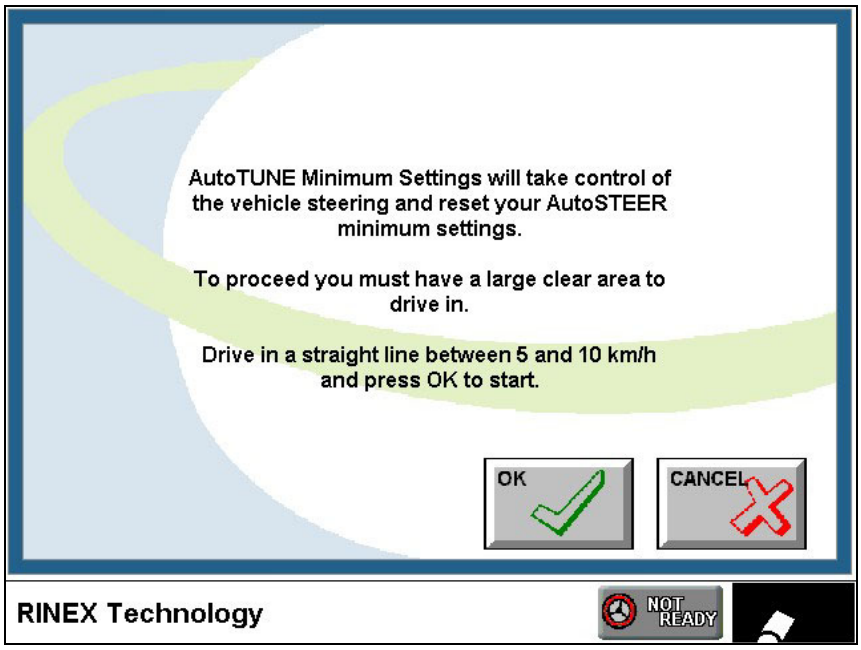

AutoTUNE Minimum Settings will take control of the vehicle steering and reset your AutoSTEER minimum settings.
To proceed you must have a large clear area to drive in.
Drive in a straight line between 5 and 10 km/h and press OK to start.
OK
CANCEL
RINEX Technology
NOT READY

Figure 9-7: AutoCALIBRATE Window

Overview: The AutoCALIBRATE window, see Figure 9-7 displays a message instructing the driver to drive in a straight line at low speed.

Access: **AUTOSTEER STATUS**
CALIBRATE STEERING
AUTOCALIBRATE

Name	Function
OK Button	The OK button displays the RINEX AutoSTEER – AutoCALIBRATE window.
CANCEL Button	The CANCEL button returns to the previous window.

9.1.3.6 RINEX AutoSTEER – AutoCALIBRATE

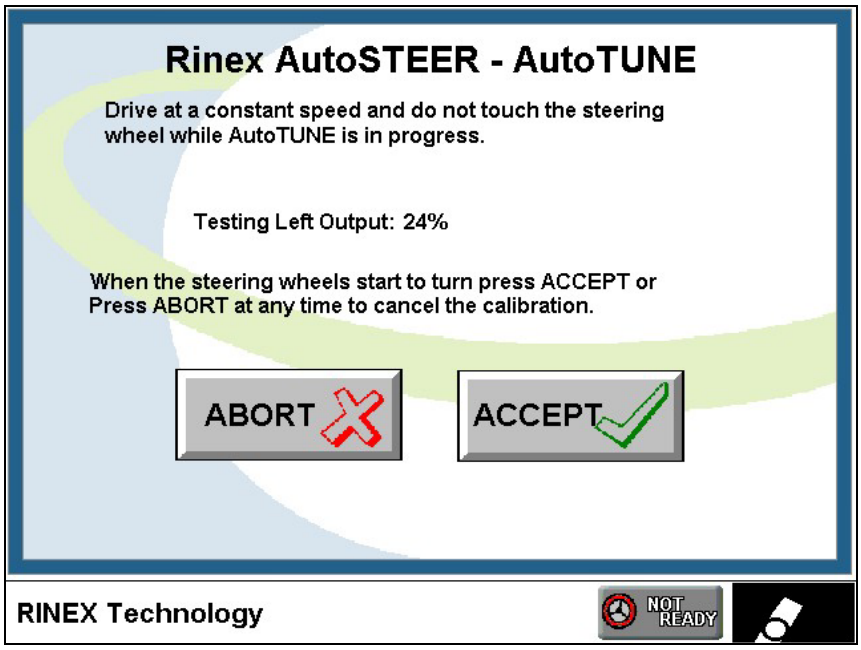

Rinex AutoSTEER - AutoTUNE
Drive at a constant speed and do not touch the steering wheel while AutoTUNE is in progress.
Testing Left Output: 24%
When the steering wheels start to turn press ACCEPT or Press ABORT at any time to cancel the calibration.
ABORT
ACCEPT
RINEX Technology
NOT READY

Figure 9-8: The RINEX AutoSTEER – AutoCALIBRATE Window

Overview: The RINEX AutoSTEER – AutoCALIBRATE Window, see Figure 9-8 automatically calibrates the AutoSTEER minimum output settings.

After 10 seconds the Testing Left/Right Output figure increases the valve output by 1% every second until the ACCEPT button is pressed.

Access: **AUTOSTEER STATUS** **CALIBRATE STEERING** **AUTOCALIBRATE** **OK**

Name	Function
ABORT	The ABORT button cancels the AutoCALIBRATION function and returns to the Calibrate Steering Window.
ACCEPT	The ACCEPT button saves the displayed Testing Left/Right Output value and returns to the Calibrate Steering Window.

9.1.4 Calibrating RINEX AutoSTEER Manually

Table 9-1 below describes each setting required for calibrating your RINEX AutoSTEER system, along with recommended values.

Follow the procedure in Section 9.1.4.1 below to manually calibrate your system.

Table 9-1

Setting	Description	Approximate value range
Prop Gain (Proportional Gain)	Proportional Gain is the aggressiveness of the hydraulic system. If this value is too high there will be sharp left / right turns; if this value is too low the steering will wonder and be non-responsive. Decrease this value to get more stability, but less response (more drift). If the vehicle is drifting away from the line or not approaching the line fast enough, increase the value in increments of 1.0. Decrease the value if the vehicle is oscillating at too high a frequency.	Normal Range 10-20 Default 18
Min Left (Minimum Output Left)	Minimum Left is the minimum voltage required before getting a response by the hydraulic valve when turning LEFT. Minimum Left is expressed as a percentage.	Normal Range = 25 to 50 Default 25 Note: It is normal with the supplied valve to have a difference of 10 to 15% between the Left & Right Minimum setting
Min Right (Minimum Output Right)	Minimum Right is the minimum voltage required before getting a response by the hydraulic valve when turning RIGHT. Minimum Right is expressed as a percentage.	Normal Range = 25 to 50 Default 35 Note: It is normal with the CSI supplied valve to have a difference of 10 to 15% between the Left & Right Minimum setting

Nose	The nose is the projected point in front of the vehicle where the vehicle is trying to come online. A larger Nose value will provide more stability but will take longer to come online. If the nose value is too low the machine will tend to oscillate left and right. The Nose is measured in seconds therefore as the vehicle speeds up the nose point is lengthened or shortened as the vehicle slows.	Normal Range = 6 to 12 Calculate as 200 divided by the normal maximum speed (km/hr)
X	X is how hard the steering will push left and right when it is offline. If X is too low the machine will tend to drift slowly away from the line. If this value is too high the machine will tend to oscillate left and right of the guideline.	SP Sprayers & Tractors Normal Range = 5 to 7 4WD Articulated Tractors Normal Range = 12 to 18

9.1.4.1 Calibration Procedure

1) Establish Minimum Left and Minimum Right Settings.
    a. Use the AutoCALIBRATE left and right buttons to find the optimum settings by following the on-screen instructions
2) Set the Proportional Gain to 18 and AutoSTEER a straight curve (10,000m radius) using the Radius Test (see Section 9.1.3.4).
    a. Check for excessive oscillations left and right.
        i. If excessive reduce Proportional Gain
    b. Check that resulting line is straight and not excessively curved left or right.
        i. If the line is curved excessively right then the Minimum Right is too high or the Minimum Left is too low
        ii. If the line is curved excessively left then the Minimum Left is too high or the Minimum Right is too low
3) AutoSTEER a radius of 100m to 200m (right turn) using test.
    a. Check for excessive oscillation left and right while turning.
        i. If excessive reduce Proportional Gain, if un-responsive (takes a very long time to achieve desired radius) increase Proportional Gain
        ii. If Proportional Gain has changed during this test, recheck step 2
4) AutoSTEER a radius of -100m to -200m (right turn) using test.
    a. Check for excessive oscillation left and right while turning.
        i. If excessive reduce Proportional Gain, if un-responsive (takes a very long time to achieve desired radius) increase Proportional Gain
        ii. If Proportional Gain has changed during this test, recheck step 2

5) Calculate Nose value to use.

    a. The starting value for the nose should be 200 divided by the average maximum speed of operation. Eg 200 / 30km/hr = 6.7

6) X = 5.5 for SP Sprayers and FWA Tractors or X = 13.5 for Articulated Tractors

7) Set AB Line, Starting at 1m to 2m from the AB line and within 10 degrees of the line set AutoSTEER ON while travelling at 70% of the Normal max speed

    a. Observe the X value on the status bar AutoSTEER info. The x is the distance the nose point is offline.
    Also observe the light bar distance which is the distance the application point is off line.

    b. X on the status bar AutoSTEER info should oscillate +/- 0.5 in a regular pattern while the application point should move smoothly online and stay there.

    c. The following diagrams in Figure 9-9 will give you an indication of what value may be too high or low for a given problem. The nose and x value should be changed in 0.1 increments.

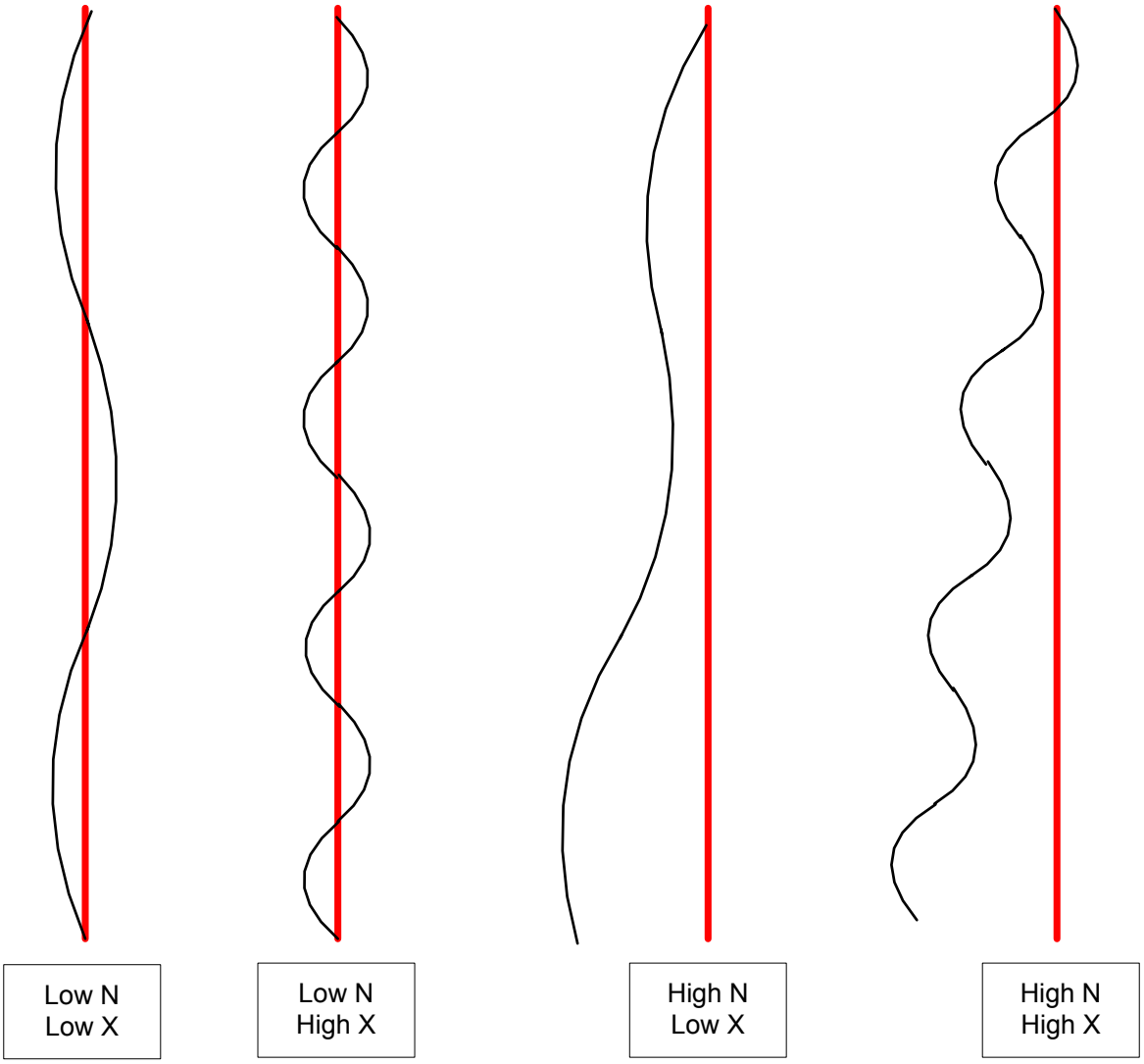


Figure 9-9: Nose and X Values

9.2 Beeline Arro

9.2.1 Connecting the Beeline Arro AutoSTEER Controller

Connecting the Beeline AutoSTEER Controller to the Saturn HT system is a simple process. Supplied with the AutoSTEER system is the AutoSTEER Controller Serial Interface Cable.

To connect the AutoSTEER Controller Serial Interface Cable., insert the circular 8 pin connector into the grey serial connector of the Internal Tractor Loom (The red power connector remains disconnected). Then insert the 9 pin connector into the GPS port of the Saturn HT. (See diagram below)

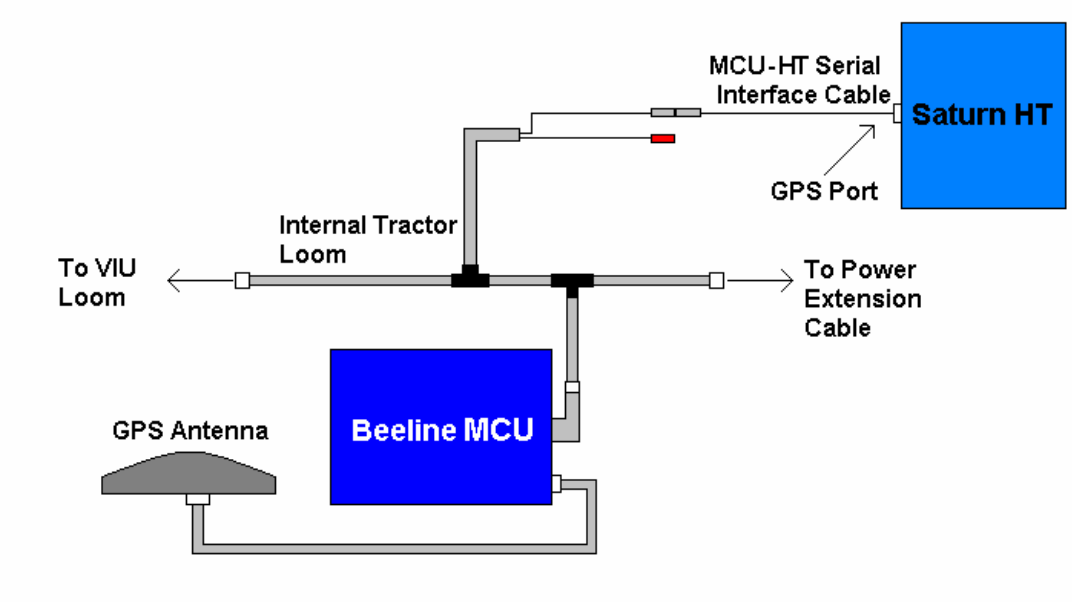


Figure 9-10: Connecting the Beeline AutoSTEER hardware to the Saturn HT

9.2.2 Enabling Beeline Arro AutoSTEER

When the Beeline Arro AutoSTEER controller has been fitted to your vehicle and connected to the Saturn HT, the option must be activated in GuideTRAX V3.

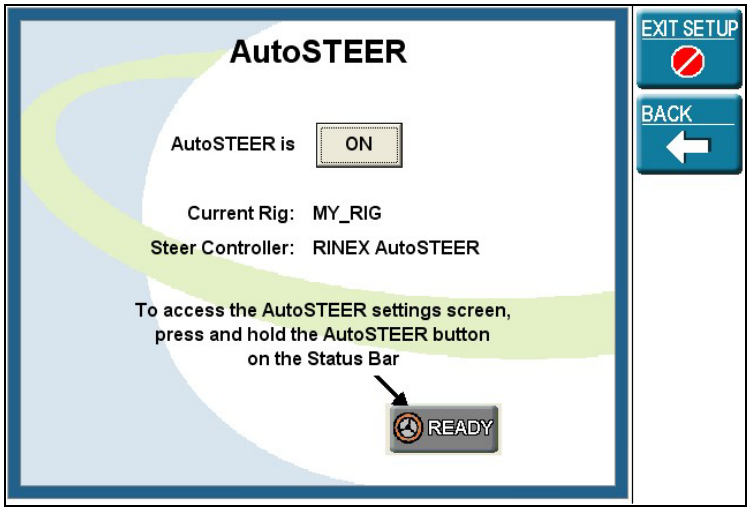


Figure 9-11: AutoSTEER Window

Overview: The AutoSTEER Window allows AutoSTEER to be turned ON/OFF.

Access: **SETUP** **AutoSTEER**

1) From the AutoSTEER Window (see Section 7.3.2) select AutoSTEER On by touching the AutoSTEER ON/OFF button.

2) Now touch OK. A window will be displayed informing you to restart the system.

3) Turn the vehicle ignition off, wait for the system to shutdown and then turn the vehicle ignition back on.

4) When the system starts up again, a disclaimer screen as shown in Figure 9-12 will be displayed. Read the information carefully and if you agree press OK, if you do not agree with this disclaimer, press cancel and the system will disable AutoSTEER. The disclaimer will be displayed every time the system is started.

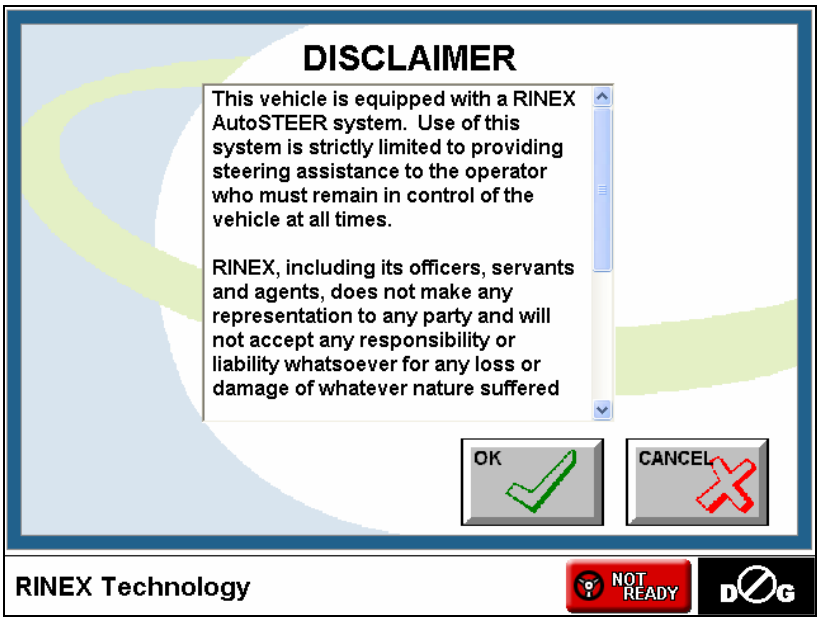

DISCLAIMER
This vehicle is equipped with a RINEX AutoSTEER system. Use of this system is strictly limited to providing steering assistance to the operator who must remain in control of the vehicle at all times.
RINEX, including its officers, servants and agents, does not make any representation to any party and will not accept any responsibility or liability whatsoever for any loss or damage of whatever nature suffered
OK
CANCEL
RINEX Technology
NOT READY

Figure 9-12: Disclaimer Window

9.2.3 Beeline Arro AutoSTEER Screens

9.2.3.1 Beeline AutoSTEER Status Window

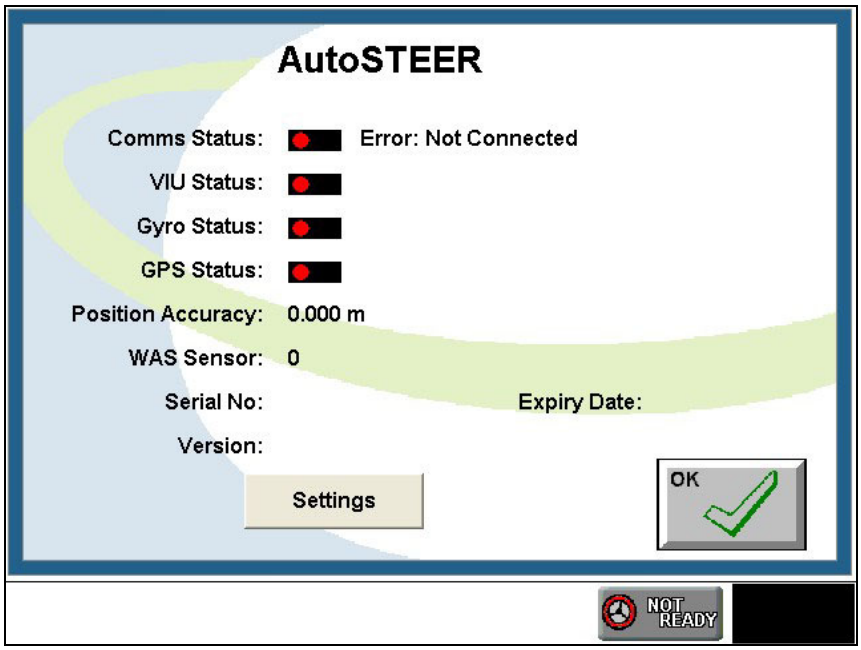


Figure 9-13: Beeline AutoSTEER Status Window

Overview: The Beeline AutoSTEER Window, see Figure 9-13 provides AutoSTEER status information and allows testing and changing various Beeline AutoSTEER settings. It is accessed by touching the AutoSTEER Status button at the bottom of the screen in the Status Bar.

See Appendix 6 for a description of any error messages

Access: **AutoSTEER STATUS**

Name	Function
Comms Status	The Comms Status light indicates whether the Saturn HT system is communicating with the Beeline MCU. • GREEN light indicates good communication. • RED light indicates the Saturn HT is not communicating with the MCU.

Name	Function
VIU Status	The VIU Status light indicates whether the Beeline MCU is communicating with the VIU. • GREEN light indicates good communication. • RED light indicates the MCU is not communicating with the VIU.
Gyro Status	The Gyro Status light indicates whether the Beeline MCU is communicating with the Gyro. • GREEN light indicates good communication. • RED light indicates the MCU is not communicating with the Gyro.
GPS Status	The GPS Status light indicates whether valid GPS data is being received by GuideTRAX from the Beeline MCU. • GREEN light indicates valid data is being received. • RED light indicates valid data is not being received.
Position Accuracy	The Position Accuracy figure is reported by the Beeline MCU and is a measure of the accuracy of the received GPS data.
WAS Sensor	The WAS Sensor figure reports the position of the Wheel Angle Sensor.
Serial No	Serial No is the serial number of the GPS receiver.
Expiry Date	Expiry Date is the expiry date of the GPS subscription.
Version	Version reports the firmware version running in the MCU.
Settings	The Settings button selects the AutoSTEER Setup Window.
OK	The OK button closes the AutoSTEER Status window and returns to the Map and Virtual Road windows.

9.2.3.2 Beeline AutoSTEER Setup

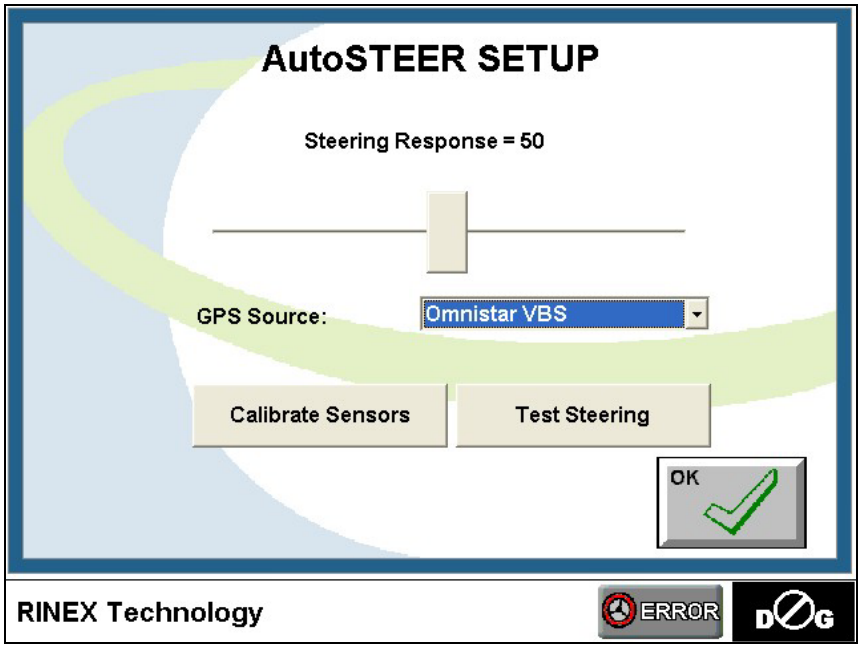


Figure 9-14: The Beeline AutoSTEER Setup Window

Overview: The Beeline AutoSTEER Window, see Figure 9-14 allows the Steering Response and GPS Source to be changed. It also provides access to Wheel Sensor Calibration and Steering Test functions.

Access: **AutoSTEER STATUS** **SETTINGS**

Steering Response	◆ If the steering seems to be too slow or sluggish, it probably indicates that the steering response is too low and should be increased. ◆ If the steering seems to be too aggressive in maintaining the path, it probably indicates that the steering response is too high and should be decreased. To change the steering response, touch and drag the slider bar to increase (to the right) or decrease (to the left).

GPS Source	The type of GPS being received can be selected using the GPS Source drop down box. There are three sources currently supported: ◆ Omnistar VBS – Sub Metre ◆ Omnistar HP – Sub Decimetre ◆ RTK – Base stations To select the GPS Source, press the drop down arrow and select the correct type by touching it in the list.
Calibrate Sensors	The Calibrate Sensors button selects the Calibrate Steering Wizard.
Test Steering	The Test Steering button selects the Test Steering Window.
OK	Selecting OK will close the window and any changes made will take effect.

9.2.3.3 Calibrate Steering

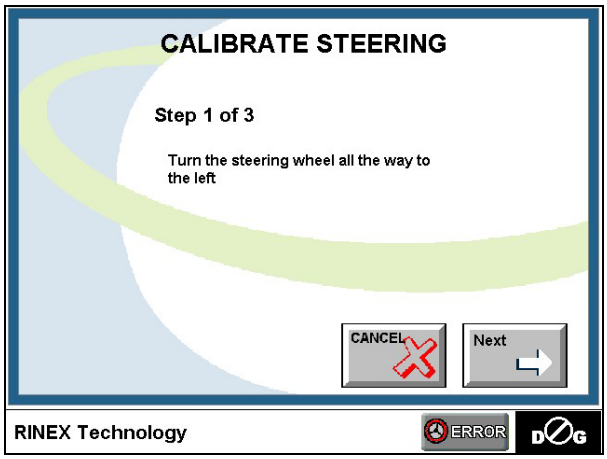


Figure 9-15: The Calibrate Steering Window

Overview: The Calibrate Steering Wizard, see Figure 9-15 allows the wheel angle sensors to be calibrated. The three step wizard asks you to turn the steering wheel all the way to the left, right, and centre.

The wheel angle sensors should be calibrated if they have been adjusted. This usually occurs if they have been replaced or damaged during use.

Access: **AutoSTEER STATUS** **SETTINGS** **CALIBRATE SENSORS**

CANCEL Button	The CANCEL button cancels the calibration process and returns to the AutoSTEER Setup window.
NEXT Button	The NEXT button displays the next step in the Calibration process.
CALIBRATE Button	The CALIBRATE button saves the last wheel angle sensor setting obtained during the calibration process, in Step 3.
OK Button	The OK button closes the Calibration Wizard and returns to the AutoSTEER Setup window.

Hints and Tips:

- *When calibrating the steering, the simplest way to align the steering wheel to the centre is to pick a point on the horizon and drive to it. When you feel that the steering wheel is in the centre and the vehicle is driving straight, press next.*

9.2.3.4 Test Steering

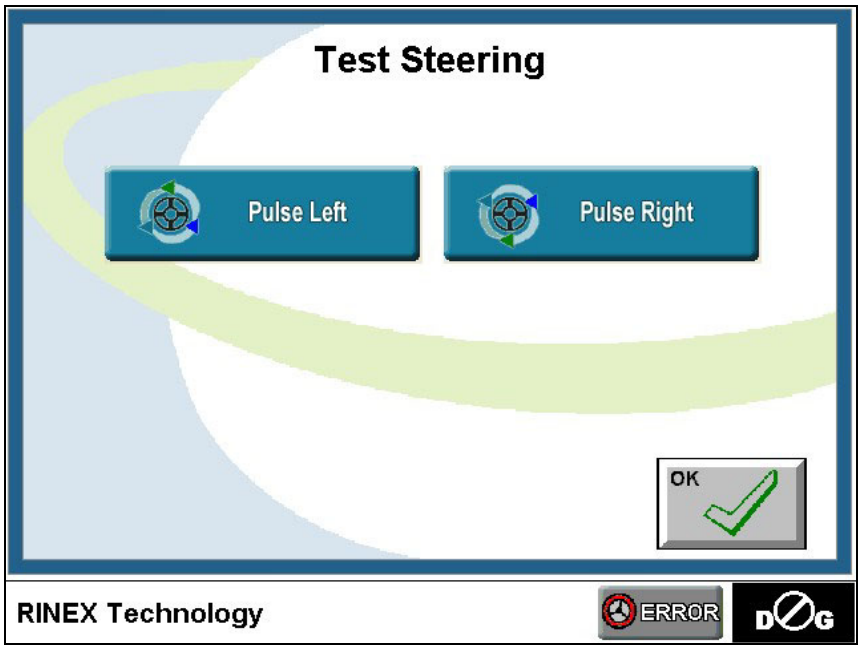


Figure 9-16: The Test Steering Window

Overview: The Test Steering Window, see Figure 9-16 can be used to verify that the steering is responsive to commands.

Access: **AutoSTEER STATUS** **SETTINGS** **TEST STEERING**

Pulse Left	The Pulse Left button will jolt the steering to the left.
Pulse Right	The Pulse Right button will jolt the steering to the right.
OK	The OK button closes the window and returns to the AutoSTEER Setup window.

9.3 The AutoSTEER Status Button

When AutoSTEER is on, a button will appear on the status bar at the bottom of the screen to the right. This button displays the current status of AutoSTEER. There are four states of operation when in AutoSTEER mode:

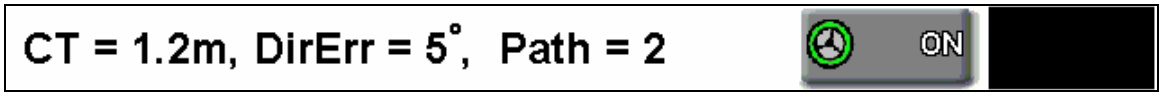
Status	Meaning	Action
	If an error occurs that is related to AutoSTEER then the AutoSTEER Status button will display ERROR.	Pressing the AutoSTEER Status Button when it shows ERROR will do nothing.
	If there is no guideline set, the vehicle is stationary or too far from the guideline, the AutoSTEER Status button will display NOT READY	Pressing the AutoSTEER Status Button when it shows NOT READY will do nothing.
	When GPS is good, the guideline has been set and the vehicle is moving along the guideline then the AutoSTEER Status button will display READY	Pressing the AutoSTEER Status Button when it shows READY will activate AutoSTEER and the vehicle will begin to steer automatically. The AutoSTEER Status Button will then change to show ON.

Status	Meaning	Action
	When AutoSTEER is active and the vehicle is steering automatically the AutoSTEER Status button will display ON	Pressing the AutoSTEER Status button when it shows ON will deactivate AutoSTEER and the vehicle will no longer be steering automatically. The AutoSTEER Status Button will change to show READY

Figure 9-17: The AutoSTEER Status Button

9.4 The AutoSTEER Status Bar

Other status information related to AutoSTEER can be viewed on the lower status bar. To view this information, touch the status bar until it displays the correct information.



- Dir Err — The Dir Err (Direction Error) indicates the direction the vehicle is travelling relative to the guideline. This is an angle displayed in degrees.
- Ctk Err — The Ctk Err (Crosstrack Error) indicates the distance the vehicle is from the guideline in metres.
- Path — The Path number indicates how many guidelines the current guideline is away from the original guideline.

9.5 Setting the Guide Points

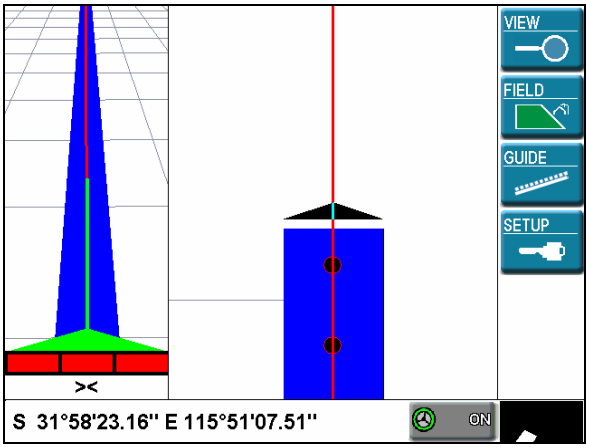
In order for AutoSTEER to become READY, the guide points must be set in the paddock. The guide points can be set using the Point A/Point B button in the Guide Menu.

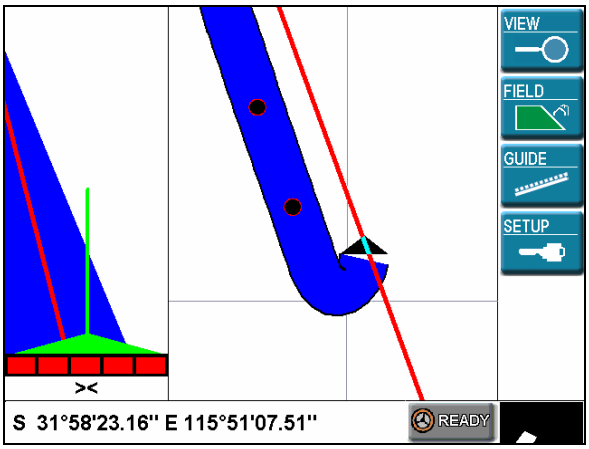
1) When the vehicle is in the desired position for the first guide point, press Point A

2) Drive for at least 20m and when the vehicle is in the desired position for the second guide point, press Point B. The further this distance, the more accurate the direction of the line will be. Ideally, place Point A at one end of the field and then Point B at the other end of the field.

3) Now press Parallel

The guideline will now be ready for use with AutoSTEER. As you move away from the current guideline, the next guideline exactly one swath width away will become the current guideline. E.g:





9.6 Activating AutoSTEER

To achieve the AutoSTEER READY state, a number of conditions must be met.

1) Guideline must be set.
2) Vehicle must be traveling parallel to the guideline.
3) Vehicle must be within 2m of the guideline.
4) Vehicle must be traveling between 1 and 29 km/hr.
5) If using VBS, the GPS position accuracy must be below 1.5m. If using HP, the GPS position accuracy must be below 0.5m. If using RTK then the GPS position accuracy must be below 0.1m. This can be viewed in the AutoSTEER Status window.
6) When the above conditions have been met, hands must be removed from the steering wheel.

When all of the above conditions have been met, the AutoSTEER status button which is displayed on the right hand side of the status bar will change to READY.

When the AutoSTEER status button is pressed while displaying READY, AutoSTEER will become active and the vehicle will start to steer automatically down the guideline. The AutoSTEER status button will display ON when AutoSTEER is activated.

9.7 Deactivating AutoSTEER

Once AutoSTEER is ON, there are various methods of deactivating.

1) Move the steering wheel.
2) Stop the vehicle or decrease speed to less than 1km/h.
3) Press the AutoSTEER status button when it is displaying ON.
4) Press Guide Off or Lock in the Guide Menu.

10

The Launcher

The Launcher is a utility that is pre-installed onto the Saturn “H” systems. It is a maintenance program that is used to perform various functions such as resetting the system, upgrading software and accessing advanced tools.

In normal operation, the Launcher program will not be seen. The system will automatically start GuideTRAX V3 when the system is activated.

10.1 Opening the Launcher

When it is necessary to open the Launcher program to perform any of the Launcher functions, the following steps must be taken.

1) Turn the vehicle ignition OFF.

2) Power down the Saturn “H” interface box by turning the IPS on the interface box to the OFF (0) position.

3) Start the vehicle ignition.

4) After the vehicle has started, power up the Saturn “H” system interface box by turning the IPS on the interface box to the ON (-) position.

5) The Saturn “H” system will now start up displaying the following screens. As the system is starting up, it will display the three screens shown in Figure 10-1, Figure 10-2 and Figure 10-3 below:

Figure 10-1: The RINEX Windows First Startup Screen

Figure 10-2: The RINEX Windows Second Startup Screen

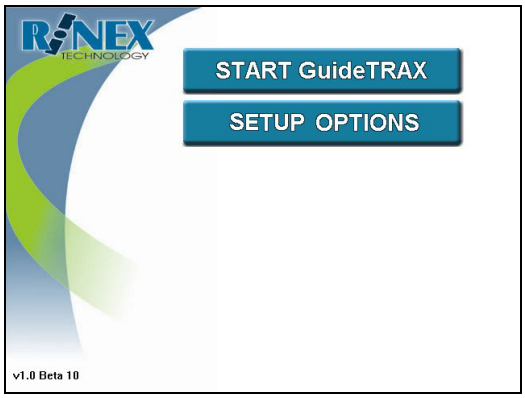


Figure 10-3: The Startup Window of the Launcher

6) Accessing the Launcher functions is detailed in the following sections.

7) The system will revert to the normal starting procedure after it is shutdown.

10.2 Using the Launcher

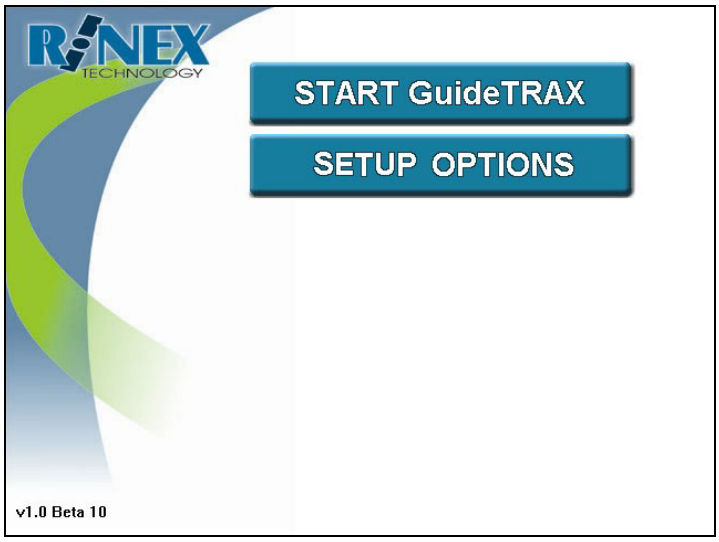


Figure 10-4: The Startup Window of the Launcher

Overview: The Launcher buttons and their functions are listed below:

Item	Description
Start GuideTRAX	The Start GuideTRAX button will close the Launcher program and open GuideTRAX V3.
Setup Options	The Setup Options button will open the Launcher Main Window. See Section 10.2.1 for more details.

10.2.1 Launcher Main Menu

Figure 10-5: The Launcher Main Menu

Overview: The Launcher buttons and their functions are listed below:

Item	Description
START GUIDETRAX	The START GuideTRAX button will close the Launcher program and open GuideTRAX V3.
UPGRADE SOFTWARE	The UPGRADE SOFTWARE button will connect to the USB and then proceed to copy the latest software to the system.
RESET OPTIONS	The RESET OPTIONS button will display a set of reset options that can be selected. See section 10.2.2 for more details.
UTILITIES	The UTILITIES button will open a window from which a password can be entered. The correct password must be entered before the Utilities menu can be accessed. Please call RINEX if you wish to access the Utilities menu. The Utilities menu contains access to various troubleshooting utilities. See Section 10.2.3 for more details.

Item	Description
CALIBRATE	The CALIBRATE button allows the touch screen to be calibrated. The appropriate calibration program for your touch screen will be opened when the Calibrate button is tapped. Follow the onscreen instructions of the calibration program to calibrate your touch screen.
RESTART SYSTEM	The RESTART SYSTEM button will restart the system.

10.2.2 Reset Options

Figure 10-6: The Reset Options Window

WARNING: Performing a Soft or Hard Reset will delete data on the system.

Overview: Reset Options allows the system to be reset so that the factory settings are restored. Reset options are explained below:

Item	Description
REPAIR DATABASE	The REPAIR DATABASE button runs the Repair Database function and returns to the Reset Options Menu. As the HL model does not use the database, it should not be necessary to use this function.
SOFT RESET	The SOFT RESET button resets certain system settings, deletes any data that has been recorded and restarts the system. All GuideTRAX settings will remain after a soft reset.
HARD RESET	The HARD RESET button will restore the factory settings and restart the system. All data that has been recorded with GuideTRAX V3 will be deleted and all settings will be set back to the default factory settings.
BACK	The BACK button will return to the Launcher Main window.

Hints and Tips:

- *You will be asked to confirm the actions of soft and hard reset.*

10.2.3 Utilities

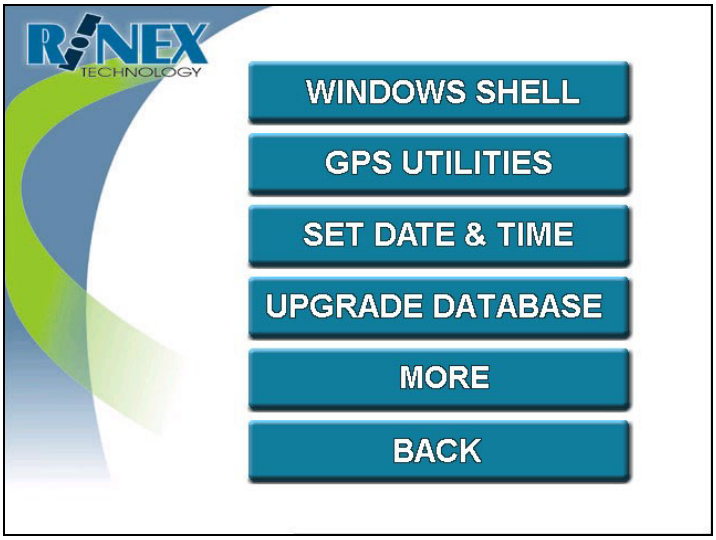


Figure 10-7: The Utilities Menu

Item	Description
WINDOWS SHELL	The WINDOWS SHELL button will display the Windows Shell interface from which Windows commands can be entered using a keyboard. To return to Launcher if the Windows Shell is opened type “Exit”.
GPS UTILITIES	The GPS UTILITIES button displays the GPS Utilities sub menu to allow viewing of GPS information.
SET DATE & TIME	The SET DATE & TIME button displays the Set Date and Time window, allowing the correct date and time to be set.
UPGRADE DATABASE	The UPGRADE DATABASE button displays the Upgrade Database window, allowing the GuideTRAX database version to be updated. Note that as the database is not used in the HL model, it will not be necessary to use this function.
MORE	The MORE button selects the More Utilities sub menu.
BACK	The BACK button will return to the Launcher Main Window.

10.2.3.1 Set Date & Time

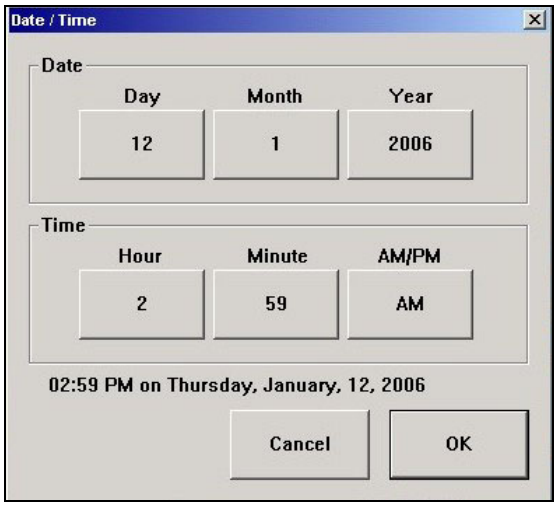


Figure 10-8: The Set Date/Time Window

Item	Description
DAY	The DAY button displays a numeric keypad for entering the current day.
MONTH	The MONTH button displays a numeric keypad for entering the current month.
YEAR	The YEAR button displays a numeric keypad for entering the current year.
HOUR	The HOUR button displays displays a numeric keypad for entering the current hour in 12 hour format (e.g., 11.00 pm should be entered as 11).
MINUTE	The MINUTE button displays a numeric keypad for entering the current minute.
AM/PM	The AM/PM button selects whether the current time is AM or PM.
OK	The OK button will update the selected actions, close the Window and return to the previous Menu.
CANCEL	The CANCEL button will ignore any selected actions, close the Window and return to the previous Menu.

10.3 GPS Utilities Sub Menu

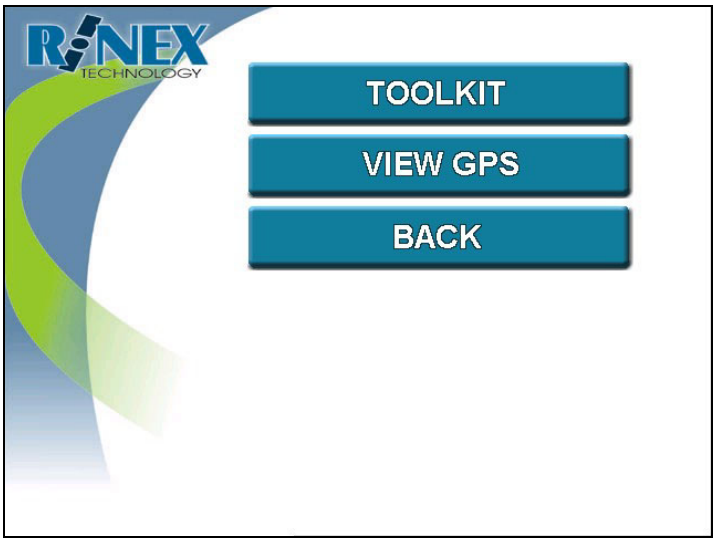


Figure 10-9: The GPS Utilities Sub Menu

WARNING: The TOOLKIT button when connected to any receiver OTHER THAN Ag114, 3000L, G12 or GEM could cause the receiver to lose its settings.

Item	Description
TOOLKIT	The TOOLKIT button will open the Toolkit program for use with your GPS receiver. The Toolkit program will allow you to view the serial number of your GPS receiver, its expiry date and the data currently being received. It also sends basic configuration information to the receiver so that the receiver can be re-set to the correct configuration if it has lost its settings for some reason.
VIEW GPS	The VIEW GPS button will display the current NMEA string being received from the GPS receiver. Use this tool to test the connection with the GPS receiver on the GPS port of the Interface Box.
BACK	The BACK button will return to the Launcher Main Window.

10.3.1 Toolkit

- **GPS Dump Tab**

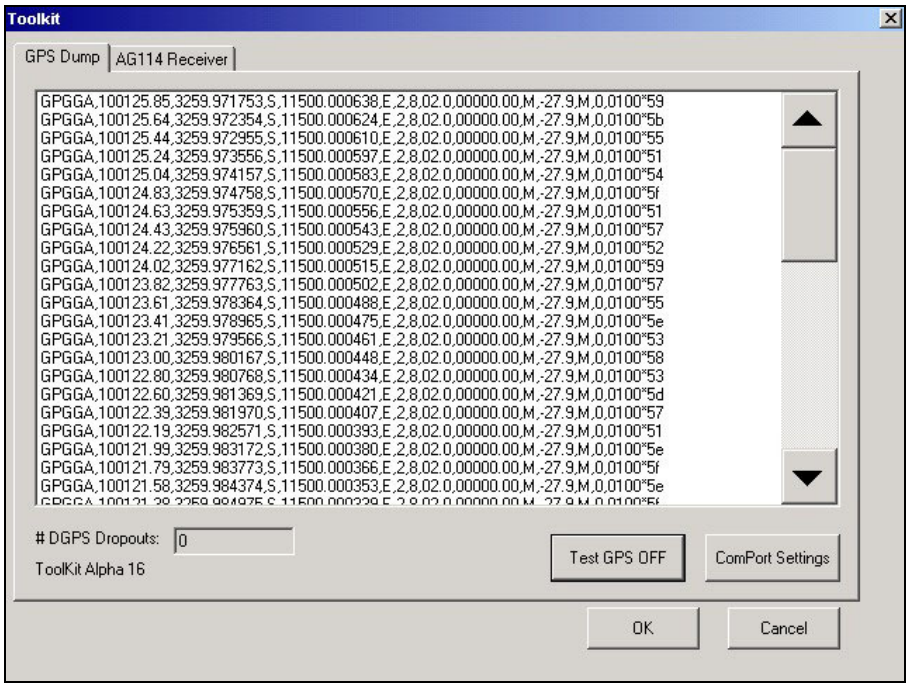


Figure 10-10: GPS Dump Window

Overview: The GPS Dump Tab Window as illustrated in Figure 10-10 displays the GPS data currently being received by the GPS receiver.

Item	Description
Test GPS ON/OFF	The Test GPS ON/OFF button starts and stops reporting of GPS data on the screen.
ComPort Settings	The ComPort Settings button allows port settings on the H Box to be changed. These settings should only be changed on advice from RINEX.
OK	The OK button will update the selected actions, close the Window and return to the previous Menu.
CANCEL	The CANCEL button will ignore any selected actions, close the Window and return to the previous Menu.

- **Receiver Tab**

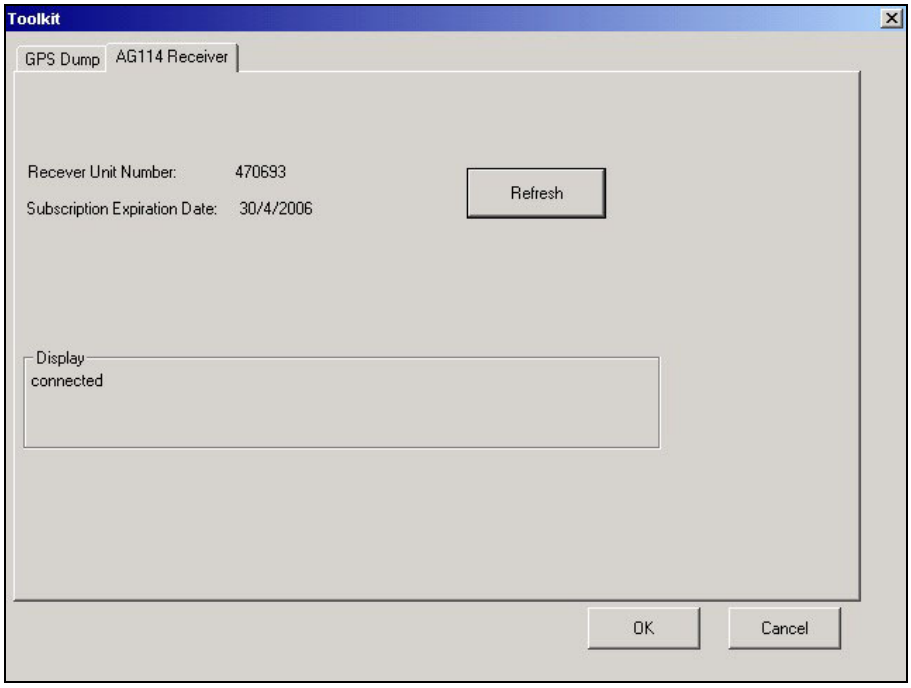


Figure 10-11: GPS Receiver Window

Overview: The GPS Receiver Tab Window as illustrated in Figure 10-11 displays the GPS receiver's serial number and expiry date. The GPS Receiver type displayed on the tab will depend on which type of receiver the system has been configured for. The supported GPS receivers for use with Toolkit are: Ag114, 3000L, G12 and GEM receivers. By default the Toolkit is configured for the Ag114 receiver. Contact RINEX for instructions on how to configure Toolkit for another receiver type.

Item	Description
Refresh	Touching the Refresh button sends standard configuration commands to the receiver and the receiver sends its serial number and expiry date to the screen.
OK	The OK button will update the selected actions, close the Window and return to the previous Menu.
CANCEL	The CANCEL button will ignore any selected actions, close the Window and return to the previous Menu.

10.3.2 View GPS

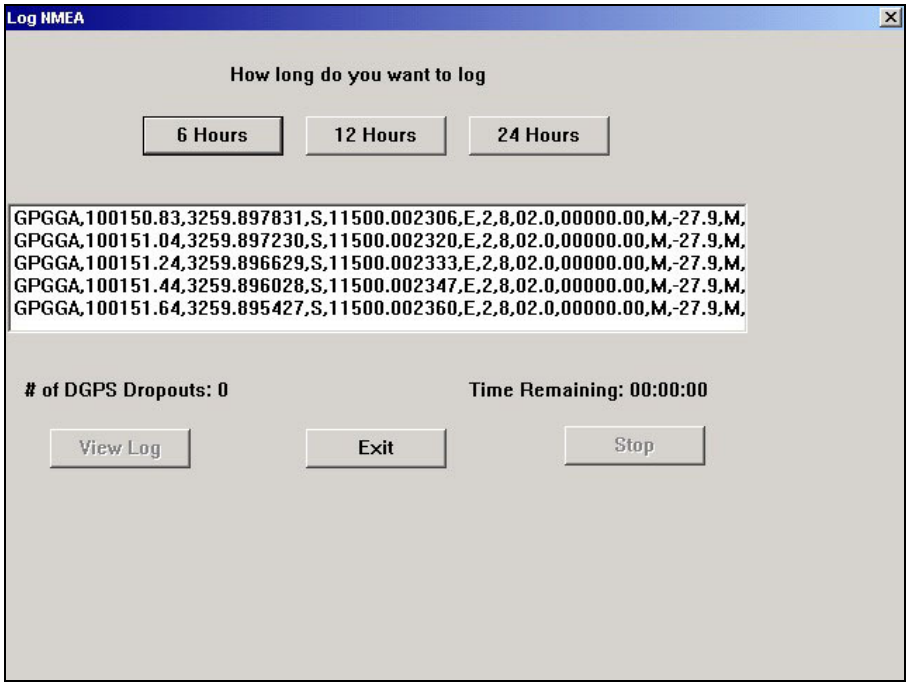


Figure 10-12: View GPS Window

Overview: The View GPS Window as illustrated in Figure 10-12 displays selected GPS data currently being received by the GPS receiver and allows the data to be logged to an external USB storage device (such as a USB drive) for later analysis by RINEX.

Item	Description
6 Hours	Touching the 6 Hours button causes 6 hours worth of data to be written to the USB storage device. The system must be left running and untouched for this period. If the Stop button is pressed before 6 hours have elapsed, the data which has been logged will be saved to the USB device.

Item	Description
12 Hours	Touching the 12 Hours button causes 12 hours worth of data to be written to the USB storage device. The system must be left running and untouched for this period. If the Stop button is pressed before 12 hours have elapsed, the data which has been logged will be saved to the USB device.
24 Hours	Touching the 24 Hours button causes 24 hours worth of data to be written to the USB storage device. The system must be left running and untouched for this period. If the Stop button is pressed before 24 hours have elapsed, the data which has been logged will be saved to the USB device.
View Log	The View Log button allows data which has been written to the USB storage device to be viewed. This button will appear light grey if logging has not commenced (by pressing one of the 6 hour, 12 hour or 24 hour buttons).
Exit	The Exit button will close the Window and return to the previous Menu.
Stop	The Stop button will stop logging data to the USB storage device. This button will appear light grey if logging has not commenced (by pressing one of the 6 hour, 12 hour or 24 hour buttons).

10.4 Utilities More Sub Menu

Figure 10-13: The Utilities More Sub Menu

Item	Description
CHECKDISK	The CHECKDISK button checks the disk for errors, repairs any errors, reports the results to the screen and then returns to the Utilities More sub menu.
TEST BOX	The TEST BOX button will start the Test Box set of testing functions which test all input and output interfaces on the H Box. The Skip button can be pressed to skip a particular test.
STARFIRE	The STARFIRE button will start the Starfire Configuration utility (suitable for configuring only Starfire 2 receivers).
FIX BACKUP	The FIX BACKUP button causes the Fix Backup function to run. As the HL model does not use the GuideTRAX database, this function should never need to be used.
AG REMOTE BUTTON	The AG REMOTE button starts the AG Remote program for configuring Trimble and OmniLite receivers.
BACK	The BACK button will return to the Launcher Main Window.

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APPENDIX

APPENDIX 1 Terminology

Phrase	Description
AutoSPRAY	AutoSPRAY is an optional extra in the RINEX guidance product range that allows the Saturn HT and HR systems to control the spraying state of the boom as the vehicle drives over a treated/non-treated area.
AutoSTEER	AutoSTEER is an optional extra in the RINEX guidance product range that allows the Saturn HT and HR systems to steer automatically along a straight line using parallel guidance providing optimal accuracy.
Boom Settings	Boom details such as the number of boom sections and the width of each section.
Button	A symbol representing a function shown on the touch screen which allows the input of data or performs a function when tapped.
Current Field	The current selected field in memory (chosen from the Memory window). The current field is where all of the treatment data will be stored when treatment is commenced.
DGPS	Differential Global Positioning System. Provides more accurate positioning information where corrections are applied to the basic GPS position.
External Button Box	An optional device that is connected to the USB port of the Interface Box. This device consists of four programmable buttons that can be used with the GuideTRAX program to perform functions without having to touch the screen.
GPS	Global Positioning System. Provides basic position information to the system.

Phrase	Description
Guideline	The red line displayed on the map screen. This line may have been created by either lock or parallel guidance.
Guide Points	A set of two positions used to compute the set of parallel guidelines when using parallel guidance.
GuideTRAX V3	The software program produced by RINEX which runs on the Saturn HT system.
Launcher Program	The utility program produced by RINEX which is installed on the Saturn HT system and is used to run GuideTRAX and maintain the system.
Lightbar	An LED device that is connected to the lightbar port on the Saturn HT system that displays directional information to the operator which is typically mounted in the line of sight of the operator.
Link	Component of the vehicle measured from one pivot point to another.
Link Settings	Link details such as the number of links, the link distances and the axle distances.
Lock Guidance	The type of guidance used when working the field in either a race track or contour method.
Map Screen	The area of the screen displayed to the left of the menu buttons which displays the treatment data, the vehicle position marker and the guideline.
Menu	A group of related buttons shown to the right of the touch screen display which allow access to other menus or functions.

Phrase	Description
Multi Section Boom Interface (MSBI)	A device that is connected to the controller port on the Saturn HT system that provides an interface to the spray controller. The MSBI allows GuideTRAX to read the current status of each boom section on the spray controller and displays the status on the screen along with the treated area for each section.
Parallel Guidance	The type of guidance used when working the field in an up and back method. A set of parallel guidelines will be drawn on the screen one swath width apart.
PC	The PC device, running the Microsoft Windows® operating system, and GuideTRAX V3.
Saturn Hardware	The hardware system installed in your vehicle cabin which is used to run GuideTRAX V3. That is the Interface Box, GPS antennae and can include any connected device, cables, connectors and the touch screen.
Saturn H Interface Box	The Interface Control Box. The main component of the Saturn H system that provides an interface to other components of the system. It contains the PC board and is used to connect components such as the touch-screen and the GPS receiver.
Swath Width	The total width of the boom/implement.
Tap	To touch the touch screen once with your finger at an intended position on the screen. Care must be taken to tap the screen gently.
Toggle Switch	A device that is connected to the controller port on the Saturn HT system that allows the treatment to be turned on or off without having to touch the Vehicle Icon on the screen.

Phrase	Description
Touch-Screen	The display device which shows the progress of your operation and accepts commands by tapping buttons on the screen.
Treatment	Refers to the spraying state of the boom. If treatment is on, then the spraying state of the boom is on and treatment data will be recorded in the current field. If treatment is off, then the spraying state of the boom is off and treatment data is not recorded.
Treatment Data	The position information stored in a field when treatment is on. The treatment data is represented on the screen as a blue shaded area.
Unit	The measurement unit used to evaluate mass, volume, area, distance etc (E.g. Kilogram, Tonne and Litre)
USB Storage Device	A device that is connected to the USB port on the Saturn HT system that is used to transfer files to and from the system.
Vehicle Icon (VEHICLE ICON)	The vehicle symbol displayed on the map screen which represents the vehicle as it moves around the field.
Virtual Road (VR)	The VR is displayed to the left of the map screen. It is used to display the projected road that must be taken to follow the current guideline.

APPENDIX 2 SATURN GUIDANCE SYSTEMS

The Saturn “H” series can be easily identified by its compact interface box as shown in Figure 11-1

Figure 11-1: The Saturn “H” Interface Box

The physical properties of the Saturn “H” series interface box are as follows

230 (w) x 65 (h) x 190 (d)

1200gm

APPENDIX 3 COMPATIBLE AUTOSPRAY CONTROLLERS

Farmscan 2400 (2403 boom controller)	Raven 440
Farmscan 2400 (2405 boom controller*)	Raven 460
Farmscan 24v1	Raven 660
Croplands BA7000	Raven 661 – Rogator
John Deere SprayStar	Raven 4000
KEE Eagle	Raven 4400
KEE Mk 5	Raven 4600
Mid Tech ARC series	TeeJet 844
Mid Tech TASC series	TeeJet 844 E
	TeeJet 854

New controllers are being added to this list. If your controller is not shown, contact your local dealer to find out if it is compatible.

***** There are some variations to these models, check with your local dealer.

APPENDIX 4 SYSTEM MESSAGES

Message	Probable Cause	Try This…
Could not find lock! Move and try again.	Vehicle is too far away from the previous track. Lock method may be set to 'Left Only' or 'Right Only'.	Move within 1 swath widths of the track from which you want to follow. Check lock direction setting from Guide Setup (Section 5.6.2).
Points too close! Move and try again.	Parallel Point B was set too close to Point A.	Move the vehicle and set Parallel Point B again.
Key line already defined! Delete line?	A parallel line has already been set. System checks to make sure you want to delete the parallel line when you try to create a new one.	Press Ok if you wish to delete the current parallel line and create a new one. Press cancel if you want to keep working on the current parallel line.
Could not open port:	Another program or device is occupying the communications port.	Try closing/disconnecting the device. If there is nothing that appears to be occupying the port, try restarting the computer.
Please stop treatment before going to field menu	Treatment was on when the field menu button was pressed. When in the FIELD menu the GPS information is ignored so treatment cannot be recorded while in the field menu.	Turn treatment off and press the Field menu button again.

Message	Probable Cause	Try This…
This unit is not registered!	The system has not been registered for use.	Please contact RINEX for further information.
File Copied Successfully!	You have just saved a file and it has been saved to the transfer directory with no problems.	No action necessary.
Please restart system for changes to take effect:	System setting was changed and system must be restarted for the change to take effect.	Restart the program by pressing turning the ignition off and then turn the ignition back on.
Warning: Disk space is low.	Too many files have been saved and disk space is low.	Delete some files from Transfer directory located in the C drive.
Error No disk space available	Too many files have been saved and there is no disk space remaining.	Delete some files from the Transfer directory located in the C drive.
Error: The current position is invalid, (No valid GPS)	A parallel point was attempted to be placed while there was no GPS.	Try placing a new parallel point when GPS returns.
Warning: All data in the current field will be lost. Do you wish to proceed?	A field has been loaded into the current field and the current field must be cleared for this to occur.	If you wish for the selected field to be loaded in to the current field, press ok. Otherwise, if you wish to load the selected field into a different field, press cancel, open the correct field and then select the field for loading again.

Message	Probable Cause	Try This…
Message #1041. Warning: Before starting a new season make sure that you have emptied all tanks and that all treatments for the current season have been completed. Do you wish to continue?	The NEW season button was touched in the Season Setup Window.	The tank must be empty and all M1 to M9 memory slots in Field Memory must be empty. Either clear all Field Memory slots by restarting or archiving each field.

APPENDIX 5 TROUBLESHOOTING

Problem	Probable Cause	Try This…
System does not draw a "track" behind the vehicle	Treatment is not switched to the ON state	Check in Switch Setup (Section 6.5) to ensure the correct method of switching (toggle, touch or external) is selected.
Guide line is drawn in wrong place	An offset, or overlap value has been incorrectly entered.	Ensure overlap and offset values are correctly entered in Guide Setup (Section 5.3).
Calculated total area is incorrect	Did not return to original start point after one complete lap.	Area will not be calculated unless field is restarted and perimeter is recorded.
Calculated treated area is incorrect.	Swath width is set incorrectly.	Restart field and change swath width to correct value (Sections 3.3.1 and 4.3).
Toggle switch or boom controller will not turn spraying on/off	Incorrect controller is selected	Change controller via the Rig Setup (Section 7.3.4.2). If unable to change controller, restart field.
Error while writing to disk.	There has been an error while writing to a file or saving a file.	Try saving or restarting the field again.
Error reading file:	There has been an error in the file you are attempting to use.	Restart the field via the Field menu (Section 4.3).

Problem	Probable Cause	Try This…
Comm Error: Check cable connection.	There is a problem in the cabling or a cable has become disconnected.	Check that all cables are inserted correctly.
Range Error:	A value has been entered that is too large or too small	Enter another value that is within the range that is displayed in the error message.
Error Copying File:	An error occurred when a file was loaded.	Try restarting the current field and reload the file. If it occurs again, the file is corrupt. Please delete the file to avoid further complications.

APPENDIX 6 AUTOSTEER MESSAGES

Message	Meaning	Action
Not Connected	Cable has been disconnected from the AutoSTEER Controller or the Saturn H control unit.	Reconnect cable.
200-12	Local GPS Receiver bad device.	Reboot system. If problem persists contact RINEX.
201-0	Local GPS Receiver temperature is above the normal operating range (100ºC).	Contact RINEX
201-1	Local GPS Receiver temperature is below the normal operating range (-40ºC).	Increase the temperature in the cab.
202-0	Local GPS Receiver supply voltage is above the normal operating range (16.0vDC).	Check input voltage from tractor. The voltage should be between 10vDC and 15vDC.
202-1	Local GPS Receiver supply voltage is below the normal operating range (7.0vDC).	Check input voltage from tractor. The voltage should be between 10vDC and 15vDC.
203-9	Local GPS Receiver L1 signal update abnormal.	Reboot system. If problem persists, contact RINEX.
204-9	Local GPS Receiver L2 signal update abnormal.	Reboot system. If problem persists, contact RINEX.
205-0	Local GPS Receiver CPU load above normal operating range.	Reboot system. If problem persists contact RINEX.
206-5	GPS Antenna open circuit.	Check cabling to GPS Antenna. Contact RINEX – The antenna may need to be replaced.

Message	Meaning	Action
206-6	GPS Antenna short circuit.	Check cabling to GPS Antenna. Contact RINEX – The antenna may need to be replaced.
206-9	GPS Antenna failure.	Check cabling to GPS Antenna. Contact RINEX – The antenna may need to be replaced.
207-0	Gyro internal temperature above normal operating range (85ºC).	Contact RINEX.
207-1	Gyro internal temperature below normal operating range (-45ºC).	Ensure temperature in cab is above -45ºC. If problem persists contact RINEX.
208-9	Abnormal Gyro data update rate.	Reboot system. If problem persists, contact RINEX.
210-12	Base GPS Receiver bad device.	Reboot system. If problem persists contact RINEX.
211-0	Base GPS Receiver temperature above normal operating range (100ºC).	Contact RINEX.
211-1	Base GPS Receiver temperature below normal operating range (-40ºC).	Increase the temperature in the cab.
212-0	Base GPS Receiver supply voltage above normal range (16VDC).	Check input voltage from tractor. The voltage should be between 10VDC and 15VDC.
212-1	Base GPS Receiver supply voltage below normal range (7VDC).	Check input voltage from tractor. The voltage should be between 10VDC and 15VDC.
213-9	Base GPS Receiver L1 signal update abnormal.	Contact RINEX.
214-9	Base GPS Receiver L2 signal update abnormal.	Contact RINEX.

Message	Meaning	Action
215-0	Base GPS Receiver CPU load above normal operating range.	Reboot system. If problem persists contact RINEX.
216-5	Base GPS Antenna open circuit.	Check cabling to GPS Antenna. Contact RINEX – The antenna may need to be replaced.
216-6	Base GPS Antenna grounded circuit.	Check cabling to GPS Antenna. Contact RINEX – The antenna may need to be replaced.
216-9	Base GPS Antenna failure.	Check cabling to GPS Antenna. Contact RINEX – The antenna may need to be replaced.
232-2	GPS erratic, intermittent or incorrect.	Check cable connections. Ensure that Omnistar subscription hasn't expired. Check GPS status by touching the scrolling satellite. If problem persists contact RINEX.
300-12	GPS AGC bad component	Contact RINEX.
302-0	Gyro Yaw sensor above normal operating range.	Reboot system. If problem persists, contact RINEX.
302-11	Gyro Yaw sensor below rate of change when stationary.	Reboot system. If problem persists, contact RINEX.
303-1	WAS below normal operating range.	Check all cables connected correctly. Check the isolation switch on the MCU. If problem persists contact RINEX.
303-2	Digital output error.	Check solenoid connections. Allow to cool. If problem persists, contact RINEX.

Message	Meaning	Action
303-7	JDT steering system not connected.	Ensure that it is connected. If problem persists contact RINEX.
303-9	VIU update rate poor.	Ensure the isolation switch on the MCU is on. If not switch off and on. If problem persists, contact RINEX.
303-13	JDT system not calibrated.	Contact RINEX.
304-0	GPS error above normal operating range.	Wait until GPS is good again. If problem persists contact RINEX.